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ORIGINAL COMMUNICATIONS.

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THE INJECTION OF IODIZED OIL INTO THE SINUSES, WITH SPECIAL REFERENCE TO THE TECHNIQUE IN THE SPHENOIDAL SINUSES.*

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Pyelography, cholecystography, bronchography, etc., are recognized as indispensible diagnostic procedures at the present day. Sodium iodid, colloidal silver and bismuth have been employed from time to time in isolated instances for the purpose of sinuography. It appears, however, that this procedure did not attain any popularity until the recent introduction of iodized oil for this purpose. Goodyear[1] reported excellent results in diagnosis and treatment by this method. At the Manhattan Eye, Ear and Throat Hospital, MacKenty,[2] Wilson[3] and others have obtained equally good results. Proetz[4] devised an ingenious method of filling the sinuses of the posterior series and reported very favorable therapeutic results.

Value of Iodized Oil: Lipoidol is particularly suitable to the delicate mucosa of the sinuses. The iodin is antiseptic and the oil is soothing. Unlike aqueous solutions, its viscosity prevents its rapid escape during the interval between the injection and Roentgenographic exposure. It is superior to bismuth, it drains spontaneously within a few days. Its high radio-opacity permits its dilution with equal parts of peanut oil, as suggested by Frederick M. Law, without im-

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pairing the density of the shadow for practical purposes. It will not produce any ill effect, providing the patient is instructed to avoid swallowing the oil.

Methods of Injection: The maxillary and sphenoidal sinuses can be injected either through the ostia or by puncturing a wall. The frontal sinus has to be injected through the nasofrontal duct. To prevent the escape of the oil from the frontal sinus on account of gravity, it is best to inject this sinus in the supine position, with the head well extended and to plug the cannula and leave it in the sinus until the X-ray exposures are made. In regard to filling the ethmoidal cells, it is rather difficult to imagine that all the cells could be filled by any one method or at any one sitting. The Proetz method is very suitable for the posterior cells. The writer succeeded in injecting a large anterior ethmoidal cell, the bulla ethmoidalis (Figs. 12 and 13). Owing to anatomic variations and technical difficulties, only a small percentage of the sphenoidal sinuses can be filled through the ostia. When the ostium is very small, occluded by a large turbinate, ethmoidal cell or inspissated mucus, the sinus will have to be filled in such instances by the puncture method. In fact, where there is a dehiscence in the bony wall this is the method of necessity, because unpleasant symptoms such as Skillern[5] mentions will be avoided. The puncture method as described elsewhere by the writer[6] is a safe and accurate procedure in the hands of the experienced rhinologist, providing the steps in the technique are carefully followed. Preparation of the patient:

1. On rhinoscopic examination, the middle turbinate should be visible, because it is the most important landmark. Marked septal deviations, polypi or other obstructions have to be removed.

2. The dimensions of the sinus should be studied Roentgenographically. The required minimum dimensions are at least 8, 12 and 16 m.m. for the lateral anteroposterior and vertical diameters, respectively.

3. Anesthesia and thorough shrinkage is necessary along the middle turbinate, septum and the exposed portion of the anterior wall of the sphenoid.

4. In order to provide safety, the needle should have an automatic stop or guard. It should be marked in centimeters, so that the operator can tell at a glance the distance which the needle progressed at a given point.

5. The injection should be performed in the X-ray laboratory in order to shorten the interval between the injection and the X-ray exposure.

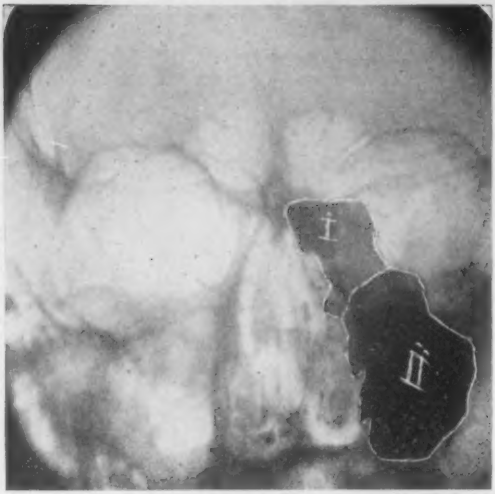

Fig. 1. Sinuogram: Case A. Posteroanterior view of a maxillary and sphenoidal sinus. The internal limit of the maxillary is characterized by an unusual irregularity in outline. There is a peculiar indentation in the inner or mesial aspect of the sphenoidal sinus due to the encroachment of the opposite sinus or asymmetry. There is practically no space between the two sinuses.

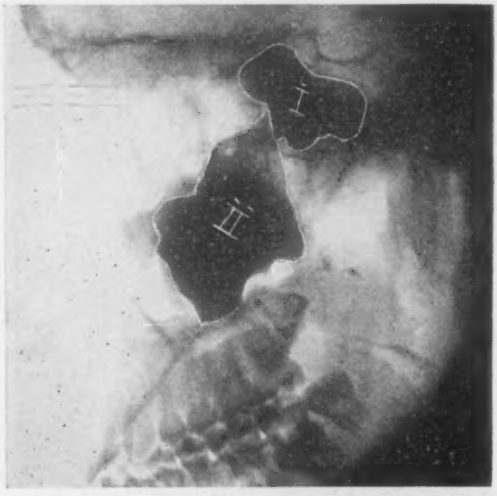

Fig. 2. Case A. Sinuogram: 1 represents a lateral view of the sphenoidal and 2 the same view of the maxillary sinus. The inferior wall of the sphenoid slopes down considerably. The maxillary sinus is immense and its orbital part comes to a sharp point, coming in close contact with the sphenoid.

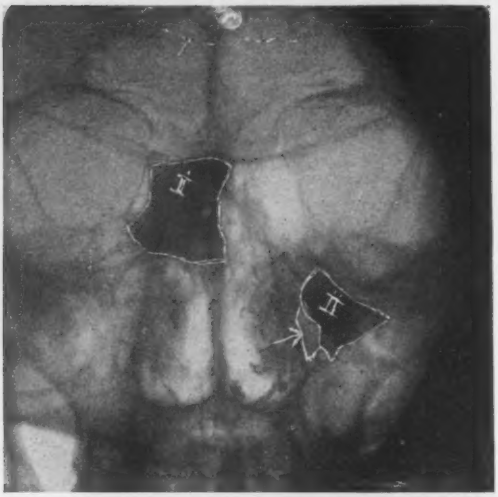

Fig. 3. Case B. Sinuogram. 1 is the sphenoidal sinus. 2 the maxillary sinus, both representing the lateral aspect. The upper border of the sphenoidal sinus slopes obliquely, terminating in a sharp point and causing asymmetry. The arrow in the maxillary sinus indicates an area of lesser density or incomplete filling of the sinus, probably due to granulation or polypoid tissue.

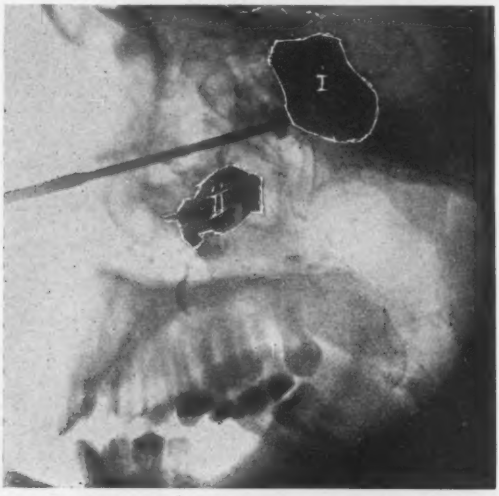

Fig. 4. Case B. Sinuogram: Lateral view of a sphenoidal and maxillary indicated by 1 and 11, respectively. It shows a fairly regular appearance of the sphenoidal sinus. The maxillary sinus is very irregular in outline and although it is impossible to point out definitely the pathologic features by this reproduction, the plate shows evidence of granulation tissue and polypoid formation.

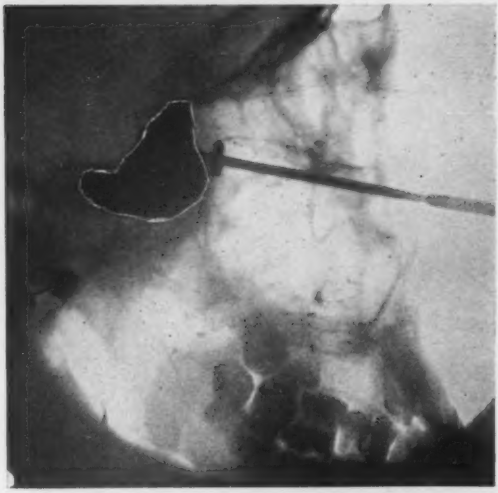

Fig. 5. Case C. Sinuogram. Lateral view of a sphenoidal sinus, the needle in place. It demonstrates an unusual prolongation of the sinus posteriorly in its lower part only.

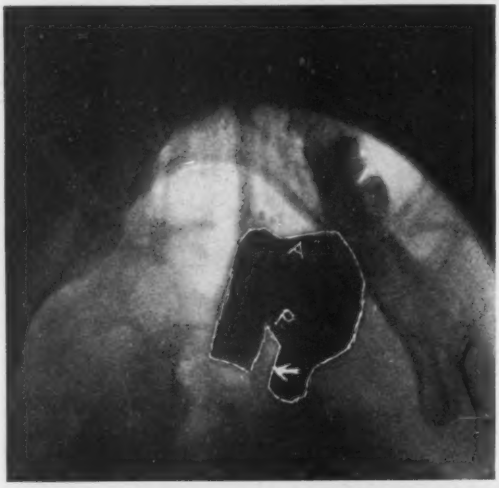

Fig. 6. Case C. Sinuogram: Vertical view of a sphenoidal sinus. It is a very large sinus. The posterior projection is of unusual occurrence. The arrow points to the accessory partition of the sinus or so-called incomplete septum. A represents the anterior, and P the posterior part.

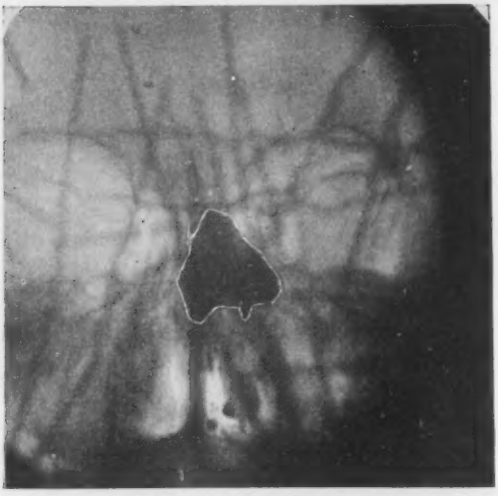

Fig. 7. Case D. Sinuogram: Posterioranterior view of a sphenoidal sinus. The pyramidal shape is rather unusual. The lower border is irregular.

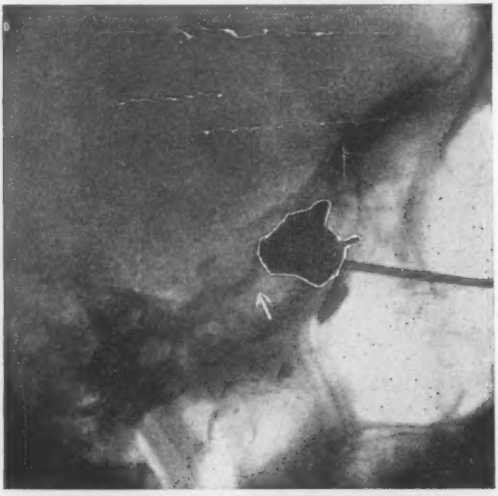

Fig. 8. Case D. Sinuogram: Lateral view of a sphenoidal sinus. Irregular projections are seen in the anterior aspect. The arrow indicates the incomplete pneumatization of the posterior part of the sinus. The sharp point or spout in the anterior wall must be interpreted as the location of the ostium, showing the egress of the oil.

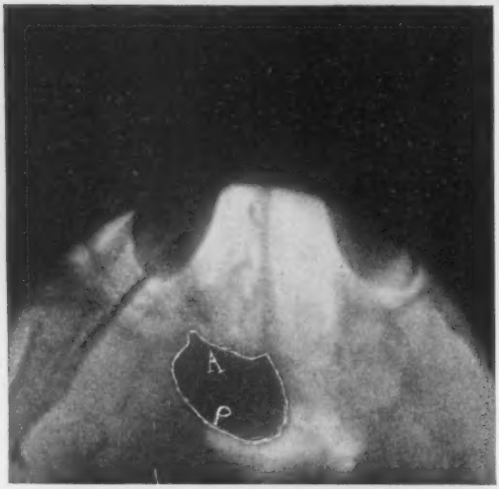

Fig. 9. Case D. Sinuogram: Vertical view of sphenoidal sinus. A is the antetrior, and P the posterior aspect. It shows a short anteroposterior diameter and the posterior portion encroaches on the other sinus. In other words, it demonstrates asymmetry. The anterior wall slopes very irregularly.

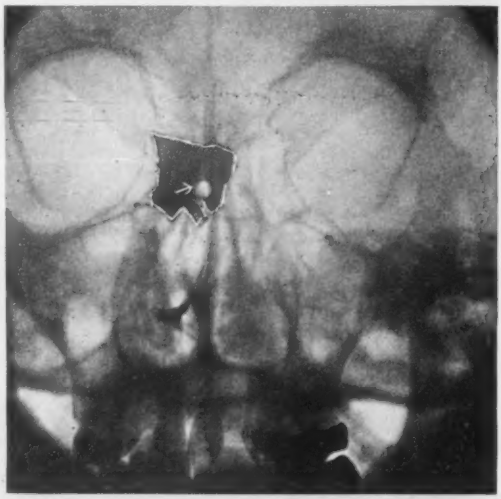

Fig. 10. Case E. Sinuogram: Posterioranterior view of a sphenoidal sinus. The upper border slopes obliquely upward and terminates into a point. The lower border is rather unusually irregular in outline. The arrow points to an area of lesser density, known in this case to have been caused by faulty technique, namely, a bubble of atmospheric air was trapped within the sinus. Nevertheless, it is of interest because it shows how the incomplete filling of the sinus is a source of valuable information in the interpretation of the sinuogram.

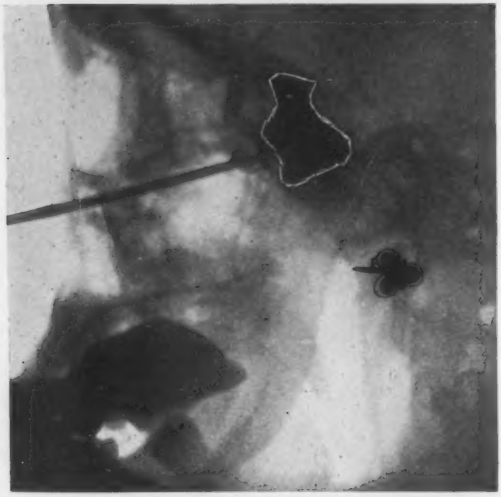

Fig. 11. Case E. Sinuogram: Lateral view of a sphenoidal sinus, showing a projection in the anterior part. A symmetrical constriction of the upper part of the sinus is also a special feature.

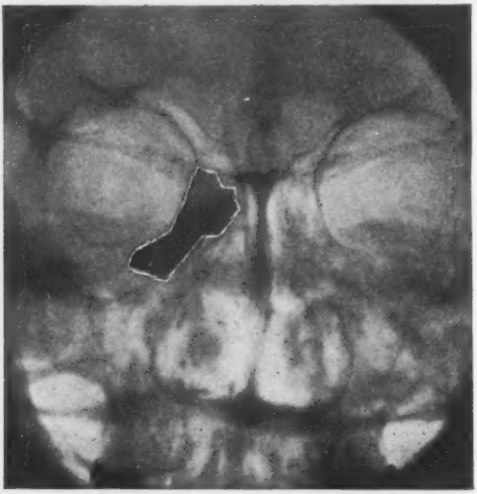

Fig. 12. Case F. Sinuogram: Anteroposterior view of an anterior ethmoidal cell. It is one giant cell, most likely the bulla ethmoidalis. It slopes beautifully around the orbital margin.

Technique of Injecting the Sphenoidal Sinus: The patient is seated, the head is held in absolute erect posture and is properly supported. The needle is passed between the middle turbinate and the septum in a moderately oblique direction, hugging the septum until the anterior wall of the sphenoid is reached. If there is insufficient space for the needle to pass, the middle turbinate can be pushed or infracted laterally with a long nasal speculum or other suitable instrument. The needle, held firmly against the sphenoid, is raised to a horizontal plane parallel to the roof of the sphenoid. The safest point to enter the sphenoid is approximately at the junction of the

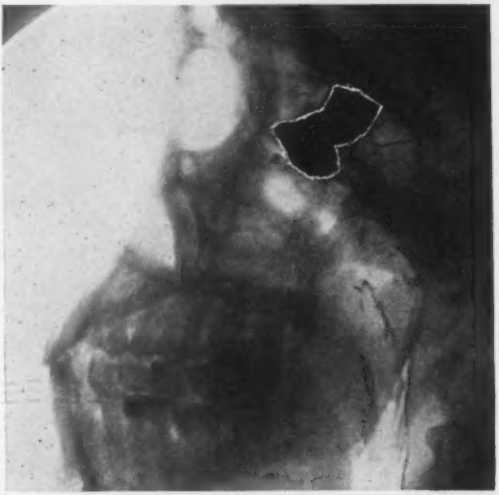

Fig. 13. Case F. Sinuogram: Lateral view of the same ethmoidal cell. This view corroborates the suspicion that it is the bulla ethmoidalis.

middle and lower thirds of the anterior wall or at least 10-12 m.m. below the roof of the sphenoid. To accomplish this part of the technique with certainty and without difficulty the following steps are to be remembered. The patient's head must be in erect posture. The needle should be brought to a horizontal plane. The relation between the needle and the middle turbinate is such that it touches the anterior border of the turbinate at least 8-10 m.m. below the root of the turbinate (Fig. 15). Occasionally the sphenoidal wall is very thick near the septum; it is then permissible to shift the needle and the shaft a few millimeters laterally. In going through the wall one should bear in mind that the wall varies in thickness. Pressure

should be applied gradually at first. After puncture the needle is allowed to proceed within the sinus until it stops automatically. The distance between the anterior limit of the nasal fossa and the sphenoid is 7-7½ c.m. Watching the needle scale one can tell how far the needle went before and after puncture. The next step is the removal of the obturator and the insertion of the adapter, to which a rubber tubing is attached. The tubing is clamped close to the adapter and 5 c.c. of the oil, previously warmed, is injected slowly through the tubing in the same manner as a vein is punctured for intravenous administration. When the patient experiences dripping into the nasopharynx, it signifies that the sinus is approximately filled. The

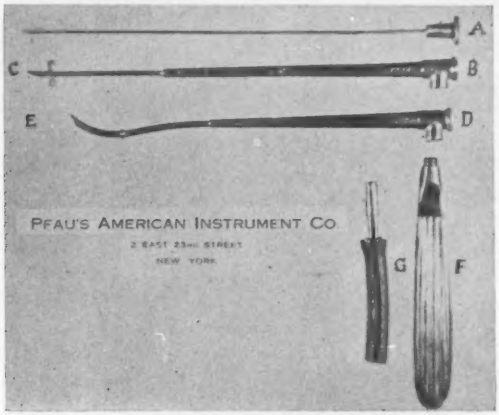

Fig. 14. (A) Obturator for sphenoid needle. (B) Sphenoid needle. (C) Guarded point by vertical pin. (D) Antrum needle. (E) Curved end or straight end if desired. (F) Universal handle for both needles. (G) Adapter with rubber tubing attached.

amount of oil varies of course with the size of the sinus, the average quantity required is about 5 c.c. No time should be wasted between the injection and the X-ray exposure. The lateral view should be taken with the needle *in situ* (Figs. 4, 5, 8 and 11). This will serve as an excellent checkup on the technique of the puncture. The needle is withdrawn for the posteroanterior and vertical positions. The patient is given a towel to catch the oil which is dripping from the nose and nasopharynx. He is instructed not to swallow the oil, because the decomposition of the oil in the intestine gives rise to symptoms of absorption.

The Purpose of the Injection: It can be utilized for three purposes: *1*. For the study of the anatomy. *2*. For diagnosis. *3*. For therapeutic purposes.

1. Sinuography offers an unprecedented opportunity to study with precision the sinuses as to size, shape, contour, anomalous extensions into the greater and lesser wings or the pterygoid processes; also to ascertain the presence of asymmetry and multiple septa within the sinus. To the surgeon it may be of considerable aid before and after operation in the visualization of the anatomic relations and in the elucidation of some obscure points. Supplementary to cadaver dissection and radiography it may be utilized as an excellent means of studying and teaching the anatomy of the sinuses (Figs. 1-12).

It may serve as a useful means of checking up on the radiographic findings of certain unusual pathologic conditions. A sinuogram can re-

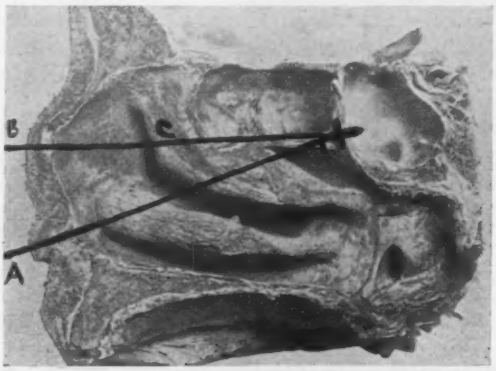

Fig. 15. Section showing diagrammatically the relationship between the sphenoidal needle and the middle turbinate in puncturing the anterior wall. A is the primary oblique position. B is the horizontal puncture position. C is the middle turbinate, showing that the needle must touch the anterior border below the root of the turbinate in order to enter the wall of the sphenoid at its lower part.

veal thickened membrane, granulation tissue, polypi, mucoceles, cysts and neoplasms. Like radiography it is not infallible. For instance it will not show pus for obvious reasons. Furthermore, if a polyp or other pathologic tissue is so situated that the oil surrounds it on every side it will not show up on the plate. It is evident, therefore, that sinuography cannot be utilized as a substitute for radiography. It merely has to be considered as a valuable auxiliary agent to radiography.

The interpretation of a sinuogram for diagnostic purposes is based on the following facts. The pneumatic spaces are occupied by a dense shadow. The line of demarcation between this shadow and the bone shadow becomes well defined and sharply outlined. The trans-

lucent mucous membrane and periosteal layer is represented by a dark line. Widening and irregularity of this line and incomplete or irregular filling of the air spaces by the oil, constitute the two main criteria in the interpretation of the sinuogram (Figs. 1, 2 and 4). The white line which is seen surrounding the sinuses in the appended illustrations is an artificial reproduction of the dark line representing the mucoperiosteal layer on the plates.

3. Theoretically, iodized oil ought to be of value as a therapeutic agent in certain types of sinusitis because iodin is a well known alterative and antiseptic and the oil soothing to the mucosa. Clinically, the patients show a diminution in the discharge and improvement in their subjective symptoms after the injection of the oil into the sinuses. However, the reports of the results are still too meager to enable one to draw definite conclusions as to the therapeutic efficacy of this procedure. Suffice it to say, at the present experimental and empiric stage, that this method deserves a fair trial.

Sinuography will accomplish one other thing. It will bring an opportunity for closer contact between the sinuologist and the Roentgenologist. As far back as 1917, Frederick M. Law[7] pointed out, in an illuminating article, that the proper interpretation of radiography depended on co-operation between the man who sends a patient for an X-ray and the Roentgenologist. The former should impart the salient features of the history and findings to the latter, if errors are to be avoided. Sinuography offers a wonderful means for compulsory contact between the two. One has to inject the oil, the other one has to do the X-ray work. The plate becomes a product of their combined efforts. It is only natural, under these circumstances, that both are intensely interested in the study of the plate.

SUMMARY.

1. Injection of radio-opaque substances for radiographic purposes are indispensable methods of diagnosis in various branches of medicine and surgery.

2. Since iodized oil has been introduced to the profession, sinuography is assuming the popularity it rightly deserves.

3. Iodized oil possesses physical and chemical properties which make it very suitable for the sinus mucosa.

4. The sinuses can be filled either by injecting the oil through the ostia or by puncturing one of the walls.

5. The puncture method has greater accuracy and is very successful in the maxillary and sphenoidal sinuses.

6. The sinuologist should inject the sinuses in the X-ray laboratory just as the urologist does in pyelography. To prevent the escape of the oil from the sinus, the minimum time should be spent between injection and X-ray exposure.

7. Sinuography is of indisputable value in the study of the morphologic variations of the sinuses. The surgeon, the student and the teacher will find it of equal importance.

8. In conjunction with radiography, this method will prove its value as an auxiliary agent in diagnosis of obscure conditions. It is no substitute for radiography because it is not infallible.

9. The evidence submitted suggests that the oil has some therapeutic value in certain types of sinusitis.

10. It offers an unprecedented opportunity for closer co-operation between the sinuologist and the Roentgenologist than exhibited heretofore.

The writer wishes to extend his gratitude to Drs. John E. MacKenty, Arthur S. Wilson and Frederick M. Law for the privilege of using their departments in this work and for their valuable suggestions.

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1420 Grand Concourse.

PLASTIC SURGERY OF THE NOSE.*

DR. ROBERT H. IVY, Philadelphia.

There are several ways of classifying nasal deformities: according to the etiology (congenital, syphilitic, traumatic, etc.); according to the part of the nose involved (bridge, tip, ala, etc), and according to the extent of the deformity (total, subtotal).

Acquired deformities of the nose are due to trauma, disease, or incurred in the treatment of disease. They may be limited to one portion of the nose, such as the dorsum, the tip, the columella or the ala, or practically all parts of the nose may be involved. There may be simply a displacement of the tissue, *e. g.,* lateral deviation of the nasal bones, or an actual loss of tissue. Time limits us to a consideration of cases of *deficiency* of tissue. In all defects of the nose, it is necessary to consider whether there is a deficiency of covering skin, lining mucous membrane, and supporting bone or cartilage, or a combination of two or more of these. If two or more of these tissues are wanting and only one is replaced at operation, the result is not likely to be very successful. For example, in total nasal defects, the older operations simply comprised a covering skin flap without any provision for lining, with the result that a formless, shrunken mass was produced, without airways. One is reminded here of the old story about Dieffenbach, one of the early masters of this branch of surgery. A man came to him with a marked nasal defect and asked to have something done because people on the street pointed and said, "There is the man without a nose." Dieffenbach operated, bringing down a flap of skin from the forehead. After a time the patient came back and said, "Doctor, I want you to cut off my nose again, because people on the street now point and say, 'There is the man *with* the nose'."

With modern developments and advances in tissue transplantation there is very seldom any excuse for making the reconstructed organ look worse than the original defect.

For deficiencies of *skin covering,* pedicled flaps may be obtained from various near and distant parts. By what is known as the *French method,* flaps are raised from nearby parts of the cheek and brought over to the nasal defect. This method does not give very satisfactory cosmetic results, even in comparatively small defects,

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because the cheek scars make an additional conspicuous deformity. The *Italian method,* employed by Tagliacozzi in the sixteenth century, is equally unsatisfactory. Here, a flap of skin is prepared on the arm just above the elbow, its free end sutured into the nasal defect, the forearm being fixed to the head by means of a plaster cast until union occurs. At a second operation the arm pedicle is severed and the flap fashioned to form the nose. This method is exceedingly

Fig. 1.

Fig. 2.

Fig. 1. Defect of ala and tip of nose due to electric wire burn. There is a considerable amount of scar tissue about the defect.
Fig. 2. Repair of defect shown in Fig. 1 by flap from arm.

Fig. 3. Repair of side of nose and cheek. (a) Lining made from inverted cheek flap, covering from forehead. (b) Hinge flap from cheek turned over to form lining. (c) Raw surface covered by flap from forehead with pedicle at temple. Angle of mouth brought down by pedicled flap from lower lip transposed into upper. (d) Pedicle of forehead flap severed and replaced on forehead.

irksome to the patient and access to the wound for cleansing, dressings, etc., is difficult. Moreover, the texture of the arm skin differs so markedly from that of the face that cosmetic results are not good (Figs. 1 and 2). We have recently seen a modification of the Italian method, used by Ferris Smith, of Grand Rapids, which presents many advantages. A tube pedicle is first prepared on the arm, its distal end being just above the elbow. At a second operation the lower end of the pedicle is severed and brought up to the facial de-

fect. It is maintained by fixing the arm in the Velpeau position with plaster of Paris, the head being slightly inclined toward the shoulder. This is much more comfortable for the patient and gives easy access to the wound.

The *forehead* is the best source of a pedicled flap to supply skin for the nose. A flap with pedicle either at the inner third of the eyebrow, nourished by the angular and supraorbital arteries, or at the temporal region, nourished by the superficial temporal artery, is well supplied with blood, is easily maintained in position, and the skin has

Fig. 4.

Fig. 5.

Fig. 4. Defect of side of nose and cheek due to noma.
Fig. 5. Same case after repair by method shown in Fig. 3.

Fig. 6. Restoration of columella by Dieffenbach's method, taking a strip of full thickness of the middle of the upper lip.

a texture very similar to the normal skin of the nose. Flaps of sufficient size can be obtained from the forehead to supply the entire covering of the nose as well as lining the alae and forming the columella.

Lining of the nose can be restored in several ways: For the alae, lining is best made by folding in the distal end of the forehead flap. Lining for the upper part of the nose can be furnished by turning in skin from the margins of the defect by inverting a pedicled skin flap, or by epithelializing the under-surface of the forehead flap by

Thiersch or full-thickness skin grafts. Free Thiersch or full-thickness skin grafts are also sometimes used for covering superficial skin defects of the nose and for raw surfaces on the forehead after removal of pedicled flaps.

Fig. 7.

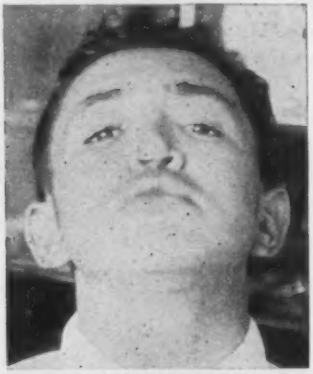

Fig. 8.

Fig. 7. Congenital syphilitic defect of columella.
Fig. 8. Case shown in Fig. 7 after repair by Dieffenbach's method.

Fig. 9.

Fig. 10.

Fig. 9. Traumatic saddle nose.
Fig. 10. Case shown in Fig. 9 after restoration of bridge by implantation of costal cartilage through incision beneath tip of nose.

Supporting Tissue. There has been much discussion regarding the best supporting tissue in nasal restoration. At one time paraffin was extensively used, but it should have no place in plastic surgery of the face at the present time. It is difficult to control in injection, thus causing unsightly swellings, may undergo changes in shape, and has

caused embolism and tumor formation. Celluloid, ivory and other foreign substances have their advocates, particularly in Germany and Austria. These materials have the advantage that incision of another part of the body of the patient is not required, but they are subject to all of the disadvantages of any foreign body, *viz.*, that extrusion is possible at any time. Transplanted bone as a support for the bridge of the nose is employed by some surgeons. It is a well known fact

Fig. 11.

Fig. 12.

Fig. 11. Traumatic saddle nose due to automobile accident. Scar contracture of lining causes elevation of tip with nostrils facing forward.
Fig. 12. Profile of case shown in Fig. 11.

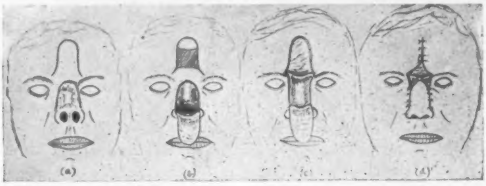

Fig. 13. Nelation and Ombrédanne's method of supplying lining for the nose. (a) Incisions. (b) Nasal covering flap turned down producing opening into nasal cavity. Removal of epithelium from part of forehead flap. (c) Forehead flap turned down and inverted to form lining of nose. (d) Covering flap replaced.

that a bone graft embedded in soft tissues will usually undergo absorption in time, and for permanency it must be in good contact with bone at each end. This obviously renders it unsuitable as a nasal support in most cases. Also, the slightest infection will lead to loss of the graft. I am quite aware of the successful results obtained by Dr. Carter, of New York, and by Dr. Lee Cohen, of Baltimore, by the use of the combined rib bone and cartilage graft. In my hands I

find costal cartilage alone to answer the purpose just as well, with easier technique and less risk of infection.

Costal cartilage in my opinion is by far the most suitable of all of the substances suggested for supporting tissue for the bridge of the nose. It is not difficult to obtain in any quantity desired, is easily trimmed to suitable size and shape, and rarely undergoes absorption when embedded in soft tissues. Considerable suppuration may follow its insertion without loss of the transplant.

Various types of nasal defect will now be considered individually.

Loss of an ala means that there is a deficiency of skin covering as well as lining. By far the most satisfactory results in my hands have been obtained by using a pedicled flap of skin from the forehead,

Fig. 14.

Fig. 15.

Fig. 14. Case shown in Figs. 11 and 12 after operation by Nelaton and Ombrédanne's method.

Fig. 15. Profile of case shown in Fig. 14, after operation. It was unnecessary here to insert any cartilage.

after inverting skin from the edge of the defect to form lining (Figs. 3, 4 and 5). This has proved greatly superior to the use of cheek or arm flaps. A method that I have not used personally, but which Ferris Smith has employed with excellent results in a case with little or no scar surrounding the alar defect, consists in elevating the skin of the nose above the ala in the form of a flap with its base at the edge of the defect, rolling this flap down so that its lower part forms lining and its upper part covering. The raw surface above is then covered with a full-thickness skin graft from the abdomen.

Defects of the tip of the nose are likewise very satisfactorily replaced with a pedicled flap from the forehead. If there is great objection to scarring the forehead, the tube-pedicled flap from the arm, with fixation in the Velpeau position, may be used.

Absence of the columella alone can be very well handled by the old procedure of Dieffenbach (Fig. 6). This consists in making two vertical parallel incisions through the entire thickness of the middle of the upper lip, including the mucous membrane, thus forming a strip of tissue about 1 c.m. wide. The mucous membrane representing the vermilion border of the lip is removed, and this freshened end is then sutured to a raw surface made just beneath the tip of the nose. The raw sides of the strip are partially obliterated by suturing the skin and mucosa together.

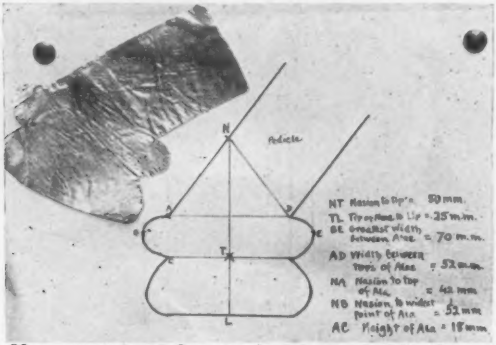
N
Radix
NT Nasion to Tip's = 50 mm.
TL Tip of Nose to Lip = 25 m.m.
BE Greatest Width between Alae = 70 m.m.
AD Width between tops of Alae = 52 m.m.
NA Nasion to top of Ala = 42 mm.
NB Nasion to widest point of Ala = 52 mm.
AC Height of Ala = 18 mm.

Fig. 16. Measurements of flap required in total rhinoplasty plotted on paper and pattern reproduced in tinfoil.

Fig. 17. Total rhinoplasty (after Blair). (a) Outline of flap on forehead. (b) Flap brought down and sutured into defect. Raw surface on forehead covered with full-thickness skin graft. (c) Pedicle of forehead flap severed and edges adjusted.

The edges of the defect in the lip are brought together with sutures, and the scar becomes almost unnoticeable after a short time. The exposed mucosa forming the lower border of the columella eventually takes on a resemblance to true skin (Figs. 7 and 8).

Saddle nose. The commonest deformity of the bridge of the nose is the so-called saddle nose, in which there is a backward displacement of the nasal bones. Depression of the bridge of the nose may also be due to an absence or displacement of the lateral and septal

cartilages. These deformities may be the result of syphilis, trauma, or operation (submucous resection of the septum), or occasionally they may be congenital. Before undertaking to correct the external deformity, it is important that internal obstructions to the breathing be removed if possible. There is generally associated with the depression an upward tilting of the tip of the nose, with an apparent broadening of the bridge. In the simplest cases, the skin and lining are intact, and it is merely a question of supplying supporting tissue. Here, undermining the skin over the bridge and inserting a piece of costal cartilage will satisfactorily restore the contour of the nose. There is some difference of opinion as to the best method of approach in this operation. Some rhinologists, notably Lee Cohen, of Baltimore, makes an incision within the vestibule of the nose. It is true that this leaves no visible scar, but there is more chance of infection to my mind, and it is more difficult for me, at least, to get the carti-

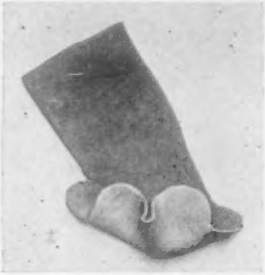

Fig. 18. Under-surface of forehead flap showing method of folding distal end to line alae and form columella.

lage perfectly straight. Personally, I prefer one of two skin incisions: *a*. *A* transverse incision just beneath the tip of the nose. The scar from this incision is practically out of sight, yet it offers easy access to the dorsum of the nose. A Freer septum dissector is passed up between the skin covering the nose and the bone and cartilage beneath, undermining the skin thoroughly to create a pocket right up to the frontonasal junction if necessary. This incision is especially suitable for depressions of the lower part of the bridge, where there is not much upward tilting of the tip of the nose. *b*. A tranverse skin incision over the nasofrontal suture. Through this incision the skin is undermined well down to the tip of the nose. The scar following healing becomes quite insignificant. This incision is more suitable for depressions involving the upper part of the bridge and enables one to push the upturned tip of the nose down with the

cartilage, wedging the upper end of the cartilage firmly against the frontal bone.

Removal of cartilage from the chest. A longitudinal incision 3 inches in length is made 3 inches from the median line of the chest, the lower part of the incision extending over the costal margin. The fibres of the rectus abdominis muscle are sepaarted, bringing into view the lower costal cartilages. A piece of full thickness of the 8th or 9th costal cartilage, about 2 inches long, including the perichondrium, is removed. The chest wound is closed with buried catgut and superficial silkworm gut sutures. A small rubber drain is allowed to remain for twenty-four to forty-eight hours.

Fig. 19.

Fig. 20.

Fig. 19. Syphilitic defect of nose requiring practically total restoration.
Fig. 20. Front view of case shown in Fig. 19.

Insertion of cartilage in the nose. With a probe passed through the nasal incision the distance from nasofrontal suture to tip is measured. The piece of costal cartilage is then shaped with a knife, being made long enough for one end to fit snugly against the frontal bone above and the other reaching to the tip of the nose. The ends of the cartilage are beveled so that its under-surface is convex to fit the concavity of the depressed nasal bridge, while the upper surface remains straight. As much of the perichondrium as possible is preserved. During the trimming the cartilage is held in Allis' forceps and not touched with the hands. The cartilage is then slid into place through the nasal incision, and the latter closed with one or two fine dermal sutures. Care must be taken not to have the upper end of the cartilage so high as to obliterate the natural angle or notch between the forehead and the bridge of the nose (Figs. 9 and 10).

Saddle nose with loss of lining. Some of these cases of saddle nose deformity are complicated by loss of mucous lining as the result

of ulceration and scar formation. The skin covering may be quite intact, but the tip is markedly turned up, with the nostrils facing forward (Figs. 11 and 12). Here it is necessary to supply new lining as well as support. The lining must be supplied first. This can be done either by means of free Thiersch or full-thickness skin grafts or else by inverting a pedicled flap of skin. In the free graft method, an incision is made around the lower part of the nose, at the junction with the lip, the whole external nose is raised, exposing the scar on the under-surface. This is divided, thoroughly freeing the covering. An impression is now made in softened dental impression compound of the inner surface of the nose, a suitable piece of Thiersch or full-thickness skin graft

Fig. 21. Forehead flap sutured into defect. Full-thickness skin graft to cover raw area on forehead.

is applied to the compound and inserted on this against the raw surface. The skin incision is sutured over this epithelialized form. After a week or ten days, the skin wound is opened, and the modeling compound is removed, leaving the skin graft to replace the missing mucous lining. At a subsequent operation the case is dealt with as a simple saddle nose, by implantation of costal cartilage.

Use of a pedicled skin flap to form lining of nose. Here, the method of Nélaton and Ombrédanne is often very satisfactory (Fig. 13). An inverted U-shaped flap of skin is raised over the dorsum of the nose, the top being at the nasion and the arms of the incision extending down the sides of the nose toward the alae. As the dissection proceeds downward the shrunken scar tissue lining the nose is cut through, thus permitting the tip to be brought down into normal posi-

tion, but creating a considerable opening into the nasal cavity. A vertical tongue-shaped flap of skin with its pedicle between the eyebrows is then raised from the middle of the forehead, turned downward and its distal end sutured into the gap in the nasal lining with skin facing into the nasal cavity. The portion of this flap which lies in contact with the raw surface of the upper part of the nose is previously deprived of its epithelial covering so that no epithelium is buried. The original nasal skin covering is replaced over the inverted forehead flap. The forehead defect can be obliterated by suturing its edges together, or if necessary can be covered with a full-thickness free skin graft. Two weeks later, the pedicle of the forehead flap can be severed and its edges adjusted and sutured to

Fig. 22.

Fig. 23.

Fig. 22. Profile of case shown in Fig. 19, after restoration.
Fig. 23. Front view of case shown in Fig. 22.

the surrounding skin. The interposition of this flap, by supplying lining, effectively keeps the tip of the nose down in normal position and may also be sufficient to raise the bridge. If not, costal cartilage can be implanted later (Figs. 14 and 15).

Subtotal and total defects of the nose. In a subtotal defect there is a loss of the alae, tip, columella and septum of the nose, and lower part of the dorsum, the nasal bones with or without their covering being intact.

In a total defect, the covering, supporting tissue and lining of the nose are entirely absent. From a practical standpoint, there is not much difference in the treatment of the two conditions. In saying under these circumstances that certain parts of the nose are absent, it is meant that if present they are so deformed that they are of no practical use in the repair and must be sacrificed. For example, a

case with a shrunken or displaced ala still present with the rest of the nose missing had better be repaired with a single covering flap rather than an attempt made to piece in one ala.

In all serious defects of the nose it is advisable to plan out the reconstruction beforehand by taking a plaster of Paris impression of the face and making a cast of the same material. Upon the plaster cast the nose is reconstructed in modeling clay, reproducing the lost feature as closely as possible. From this model measurements can be accurately made between various points and plotted out on paper, and a pattern reproduced in tinfoil, giving the exact size and shape of the forehead flap to be used in reconstruction of the nose (Fig. 16). Many forms of forehead flap have been suggested in total and subtotal reconstruction of the nose, but in my hands the technique followed by Blair has been most satisfactory (Fig. 17). At the first operation, the tinfoil pattern is applied to the patient's forehead, with the pedicle portion slanting up from the inner third of one eyebrow toward the opposite side of the forehead, and a flap of skin and subcutaneous tissue the size and shape of the pattern is raised from the forehead, and sutured back in place for delayed transfer to the nose. Two weeks later, all of the deformed remaining portions of the nose, including the skin if present up to the nasofrontal suture, is excised, leaving a pyriform opening with raw edges. After control of hemorrhage, the forehead flap previously outlined is again raised, and sutured securely down into the nasal defect so as to restore the missing parts. The flap is so fashioned that its distal end is folded in to form the lining of the nostrils and the columella as well as forming the external covering of the nose (Fig. 18). The forehead defect is immediately covered with a full-thickness skin graft from the abdomen, cut to size and shape from the original tinfoil pattern. Two weeks later, the pedicle of the nasal flap is divided and the skin edges accurately trimmed and sutured. In most cases, even of total destruction of the nose, this soft tissue flap alone will restore the natural prominence, although the new nose may be freely movable. By folding in the distal end of the flap as described, airways are formed through the nostrils, and in the majority of cases the natural prominence of the tip will be maintained without any additional cartilaginous or bony support (Figs. 19-23). If further building out of the bridge of the nose is desired, a piece of costal cartilage can be inserted later beneath the skin. It is preferable to insert the cartilage beneath the skin of the new nose as a finishing touch, rather than to place it beneath the flap on the forehead before it is brought down, as it is much easier in the former case to judge of proper size, shape and position to be given the cartilage.

Medical Arts Building.

PHARYNGEAL OIDIOMYCOSIS IN AN ADULT. CASE REPORT AND PRESENTATION.*

DR. MYRON A. ZACKS, Philadelphia.

Synonyms: Saccharomycetic Stomatitis. Oral Oidiomycosis.

A complexity of lesions within the oral cavity have been attributed to the pathogenic influence of various species of oidium. The most common of these affections is so-called thrush, a stomatitis or a group of stomatitidis caused by species of monilia, as well as varieties of oidium. This condition is characterized clinically by the presence of small, pearly white flecks and patches, usually multiple and scattered over the mucous membrane of the mouth, predilecting such sites as the lateral margins of the tongue, inner surface of the cheeks, palate and fauces. The lesions suggest and resemble somewhat the deposit of coagulated milk, but are adherent, and when forcibly removed give rise to bleeding surfaces of the affected mucosa. For many years this condition was attributed solely to the oidium albicans, Robin, while at present it is conclusively demonstrated that a multiplicity of fungi are capable of producing this disease.

This condition was clinically known to Hippocrates. It was also known to Galen under the term aphthae albae infantum. Sauvage called the affection aphthae lactamen, while Bateman designated it as aphthae lactantium.

Langenback, in 1839, was the first to discover that the condition was caused by fungus and it is of interest to note that the patient microscopically investigated by him was suffering from typhoid fever. Langenbeck suggested, therefore, that the fungus might be the cause of this malady.

According to Sutton, Nelson and many others, thrush is pre-eminently a disease of infants; although it is occasionally found in adults of the cachectic and debilitated type, particularly those invalids in whom proper mouth hygiene has been neglected or disregarded.

It is quite common throughout the tropics but it is quite frequently found in the temperate and cold zones.

Predisposing Causes: General weakness, marasma, late stages of T. B. and diabetes, favor the development of this condition, though

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at times perfectly sound individuals may suffer from it, as demonstrated in case report herein contained.

Etiology: It is generally stated that thrush is due to oidium albicans, Robin, but the researches by Castellani, both in the tropic and temperate zones, have shown that the term oidium albicans has been used to cover a multiplicity of fungi and that the affections may be caused by hyphomycetes belonging to different species, genera and families. The fungi capable of producing thrush may be classified as follows:

Fungi Imperfecti:
- Genus Monilia Persoon
- Genus Oidium Link
- Genus Hemispora Vuillemin

Ascomycetaceae
- Genus Endomyces Link

Diagnosis: This can often be made clinically upon direct inspection. The creamy white, pearly lesions are more or less characteristic and when subjected to microscopic examination reveals striking amounts of mycelial threads and conidial forms. If, however, it is desired to know the exact etiological type, cultural identification methods are necessary.

While thrush is not an ulcerative lesion, it may be confused with diphtheroid erosion. In cases involving the pharynx, diphtheria is to be considered, but microscopic examination reveals the true nature.

Prognosis: Per se, it is not a serious affection but its occurrence in cachectic patients is a bad omen.

Prophylaxis: It is perhaps more readily prevented than removed. Since it is the general feeling that the disease does not attack normal mucosa, catarrhal affections of the mouth should be avoided if possible, and when developed should be given due consideration.

Treatment: In young infants it may be necessary to substitute natural for artificial diet. Constitutional study and care is most essential. Alkalies used locally as gargles have the greatest vogue. Administration of iodids internally in ascending doses is thought by many to exert a favorable influence on the progress and control of the affection. In children, diarrhea may be so distressing as to require paregoric for its alleviation. All forms of treatment may be of little, if any, avail until the general health of the patient is improved.

Case Report: A. S. M., age 20 years, white, male. Referred in March, 1926, because of lesions in throat, the appearance and character of which were unfamiliar to the family physician.

Examination: Patient is of normal build and weight, healthy in appearance and complaining of the usual local symptoms of a mild sore throat, cough and feeling of slight lassitude. Onset was more or less gradual and at no time were there any gastrointestinal symptoms. Temperature and pulse not elevated. Patient is unaware of any factors which would throw light on the cause of this condition. Lodges at a hotel and is compelled to obtain his meals at various restaurants. The writer examined the patient in January, 1926, when he was treated for catarrhal involvement of the upper respiratory tract and at which time the pharynx was free from any patches.

Nose: Negative except for slight turgescence.

Mouth: Gums, teeth, inner lining of cheeks, margins of tongue, palate and anterior pillars are free from membranous deposits.

Pharynx: Moderately inflamed. Tonsils absent. Breath free from odor. The lateral pharyngeal folds, together with the lingual tonsil, are studded with innumerable, pearly white, variously elevated masses, sizes of which vary from pin head to that of a medium sized millet seed. They are granular in appearance, some are brittle and break on attempt at removal, while others are adherent to the underlying tissue and cause slight bleeding when forcibly removed.

The nasopharynx, larynx and upper part of trachea show mild secondary catarrhal involvement. No lesions are present.

March 18, 1926: Culture examination showed presence of monilia albicans.

The patient was given potassium iodid in ascending doses, starting with 5 grains three times daily and when 15 grains per dose were reached and continued for a few weeks, severe drug manifestations appeared, and since there was no tendency on the part of the condition to improve, the iodids, internally, were discontinued, but were again resumed at a later date. Local treatment consisted of mild alkaline gargles, local application of alkalies, tinct. of iodin, 2 per cent mercurochrome, mercury brilliant green, etc. Projecting masses were removed with forceps and direct local applications made to this site with the above.

For the next seven months the progress was very slight and discouraging and while the lesions showed practically no tendency to diminish, there has never been any tendency to spread, either upward towards the nose, or in the downward direction towards the larynx.

September, 1926, laboratory report from Dr. John A. Kolmer was as follows:

"The smears of the white bodies which you removed from the fauces showed the presence of enormous numbers of a mold which

I have no hesitation in reporting as oidium albicans of thrush. Of course various bacteria were likewise present and mainly of the staphylococci, but I am sure these have nothing to do with the infection.

Cultures of the throat also showed the presence of the same mold.

Cultures of the feces also showed the presence of the mold, although none were found in smears. This indicates that the infection has extended to the intestinal tract but the feces showed no other abnormalities."

In November, 1926 (eight months after first examination), the lesions on the lingual site began to disappear quite rapidly and in a few weeks had practically disappeared entirely. A few weeks later the pharyngeal lesions began to disappear and at present are visible only as a small, narrow, white line on each side, slightly imbedded in the tissues of the lateral pharyngeal walls, adherent, though an occasional elevation is noted, which is quite soft in consistency and is removed without much resistance.

COMMENTS.

1. Textbooks refer to this condition as an affection of the weak and debilitated, especially in children. Our case is that of an apparently healthy adult in whom personal care was anything but lacking.

2. Limitation of involvement to lateral pharyngeal walls and site of lingual tonsil only.

3. Lack of spread of lesions from time treatment was instigated.

4. Entire absence of gastrointestinal symptoms, such as diarrhea, in spite of easy recovery of mold in the stool.

5. Absence of local symptoms except an occasional spell of coughing, when it was noted that the elevations on the lingual site were erect and impinged against the under-surface of the epiglottis. Removal of fungus stalk caused cough to rapidly disappear.

6. Obstinacy to treatment. This seems to be a characteristic of this condition.

7. For several years, all meals were taken at various clubs, restaurants and hotels and whether or not lack of proper diet, as so frequently occurs in children was operative, is difficult of exact determination. Little, if any, credit can be given this explanation in view of the fact that we would expect to meet with it more often in people who live under similar circumstances.

8. A plea is made for the smear and culture study of any oral lesion which is chronic and resistant to treatment, occurring in adults, with the thought in mind that perhaps the condition may not be as rare as textbooks and reports would indicate.

1633 Spruce Street.

BASILAR FRACTURE WITH SEVENTH AND EIGHTH NERVE INVOLVEMENT. REPORT OF A CASE.*

DR. WILLIAM G. SHEMELY, JR., Philadelphia.

Cases of fracture of the skull, irrespective of their location, are always the object of much concern to the careful general surgeon. Some of these cases must be treated in one manner and some in another. Each group has its own peculiar characteristics. Unfortunately these identifying symptoms are not always clean-cut and fractures involving the base of the skull, thus far, have proven to be an extremely difficult problem to the average general surgeon.

A careful survey of the treatment of these cases of basilar fracture by the general surgeon brings out several facts of paramount importance.

First, the average general surgeon does not seem to be familiar with the signs and symptoms of basilar fracture, their importance and correct interpretation.

Second, of the few general surgeons who do correctly interpret these symptoms, practically none are able to carry out successfully the proper operative treatment when operation is necessary.

These factors, together with the correct answer to the several problems which arise, have been thoroughly discussed in a paper by Dr. George W. Mackenzie. Dr. Mackenzie claims that in skull fractures "surgeons too often decide important questions hurriedly, operate unnecessarily, when it would be better to leave the case alone and allow cases to go unoperated which ought to be operated. It would be far safer for the patient if the surgeon summoned the neurologist and the O., O. and L. specialist at the same time he saw the case."

Careful thought will convince anyone of the importance of the correct interpretation in head injuries—of such symptoms as bleeding from the nose or throat or ear, or combination of these. Whether in the presence of unequal pupils, the smaller pupil is the result of a spasmodic myosis or whether the larger pupil is so because of a paralytic mydriasis. If squint is present, whether it is concomitant, paralytic or spasmodic. If nystagmus is observed, its character, as well as its plans and direction should be carefully noted.

The surgeon will, no doubt, say all this is true and then ask how can one study, for instance, the character, plane and direction of a nystagmus in an unconscious person? Is a true rhythmic labyrinthine

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nystagmus ever observed in an unconscious person as the result of a basilar fracture? The first question may be best answered by a short discussion of rhythmic labyrinthine nystagmus. In irritative lesion of the labyrinth, whether produced secondarily from the extension of middle ear suppuration, poisonous substances of endogenous or exogenous origin, heat or cold (caloric reaction), rotation about the central axis of the body (turning tests), or by the galvanic electric current (galvanic labyrinthine tests), certain definite to and fro movements of the eyes occur, known as rhythmic nystagmus. The term rhythmic is used to distinguished it from a purely ocular nystagmus, which is in turn called undulatory.

The rhythmic nystagmus is composed of two components; first, a slow movement, the result of the vestibular reflex; and, secondly, a rapid movement in the opposite direction, which determines the direction of the nystagmus. The latter is purely voluntary, the result of cortical innervation. The answer to the first question is, therefore, apparent. If the patient is unconscious and the lesion in the labyrinth is an irritative one, there results conjugate deviation of the eyes directed away from the affected side. With the patient conscious there yould have resulted a rhythmic nystagmus directed toward the affected side; that is to say, the direction of the nystagmus is indicated by the direction of the quick component. In destructive lesions of the labyrinth (fractures, suppurative processes, etc.) the above findings are reversed. That is, the conjugate deviation will be to the affected side, in an unconscious patient. The answer to the second question is likewise apparent from the preceding explanation. No true rhythmic labyrinthine nystagmus is ever observed in an unconscious person, since the corticle stimulation for voluntary adjustive eye movements is lacking.

Basilar fractures of the skull may frequently develop symptoms that are the result of pressure exerted directly upon the cerebellum itself or they may be the distant working symptoms (Fernwirkung) of a lesion in another part of the skull.

Thus, condition after condition might be enumerated that would serve only to strengthen the assertion made earlier in the paper that "it would be far safer for the patient if the surgeon summoned the neurologist and the O., O. and L. specialist at the same time he saw the case."

The case about to be reported is that of a young female, age 18 years, office record No. 6069. The following is a copy of the history of the patient, together with the findings at the time of her examination:

History: Patient was descending stairs. About five steps from the bottom, from some cause or other, she fell. She does not know whether or not she struck her head. Was "dizzy" in the head following the fall. (Upon describing this sensation the patient does not describe vertigo). Patient did not notice any discharge of blood from either ear. She did notice, on the next day, that she could not close her left eye, and the left side of her mouth drooped. Patient was brought to the hospital by friends. She was ambulant. Patient denies any previous ear trouble of any kind. Has had frequent tonsillitis attacks.

Present Condition: Well nourished young female of about twenty years of age. Sitting up in bed, apparently comfortable. Color of skin normal for a brunette (which she is). Left side of face has "wooden" expression. Mouth sags on the left side. Patient has about one-quarter ability to close the left eyelid. During this voluntary effort the left eyeball rolls up and slightly out. No sensation of dizziness or nausea. Lips good color (her own). According to hospital report there was blood in left ear canal upon admission.

Examination—Throat: Secondary catarrhal pharyngitis. Tonsils medium size; submerged; large crypts, several of which are filled with caseous material.

Teeth: Poor condition. Several crowned teeth as abutment posts for permanent bridge work. Several decayed teeth.

Functional Hearing Test—Right Ear: Conversational speech, 8 meters; whispered speech, 5 meters;* Weber referred to the right; Schwabach, normal; Rinné, indifferent. C-1 normal; C-4 normal; air short, 20 seconds.

Left Ear: Conversational speech, 1 meter; whispered speech, 50 centimeters; Schwabach, normal, 5 seconds; Rinné, negative, 30 seconds; C-1, very short; C-4, short; air, short, 35 seconds.

With 2 m. speaking tube in left ear and noise producer in right ear, patient heard low spoken voice 100 per cent correct. Also heard high fork (C-4) and low fork (C-1).

Otoscopic Examination — A. D.: Membrane is intact, slightly opaque. Long process of anvil not visible. Suggestion of a posterior fold. Slight retraction, in that the inferior posterior quadrant is larger than the posterior superior. Slightly limited mobility with Siegel otoscope.

A. S.: Dry red scales of blood along the floor and sides of the canal. Membrane is apparently intact, dull, opaque, of a rather bluish color (somewhat the color of a skin bruise). In the posterior superior

*Patient lateralized fork in first test to right (better ear); second test was to left (affected ear); third test was indifferent.

portion near the margin there is a small spot that seems redder than the surrounding parts, as though this might have been a very small tear. No secretion visible in the canal.

Examination for Spontaneous Nystagmus: When looking to the extreme right there is a mixed rotary and horizontal nystagmus to the right. When looking to the extreme left there is a mixed rotary and horizontal nystagmus to the left. But equal to the two sides (phys.). No spontaneous nystagmus when looking straight ahead at a small, distant, fixed object (light very poor for careful study)

Patient is able to corrugate the brow on the right side normally; very little on the left side. The left eyelid closes about one-quarter its extent. The left eyeball rotates up and slightly out during this voluntary effort. The right eye closes normally. Puckering the mouth as if to whistle and attempts at smiling, show spasticity of the muscles of the left side of the face. Sensation to heat and cold, prick of pin, and cotton appears normal and equal to the two sides.

X-rays: Negative for fracture.

Treatment: Expectant; nothing but dry sterile gauze in the canal of left ear.

Two weeks later the patient reported at the office for further examination. Otoscopic examination of the left ear showed blood crusts still present along the floor of the canal. The tympanic membrane of the left ear no longer presented the blue appearance noted at the time of the first examination.

Functional Hearing Test—Right Ear: Conversational speech, 8 meters; whispered speech, 5 meters; akumeter, 6 meters; Schwabach, normal; Rinné, positive, 23 seconds; air, shortened, 10 seconds. The low C fork (64) and the high C fork (2048) were heard for a normal length of time.

Left Ear: Conversational speech, 7 meters; whispered voice, 4 meters; akumeter, 4 meters; Weber test was lateralized to the left even when the fork was 3 inches to the right of the midline. Schwabach, lengthened, 10 seconds. Rinneé was neither positive nor negative. Air, shortened, 17 seconds. The low C fork (64) was shortened 45 seconds, and the high C fork (2048) was shortened 5 seconds. (The work used in making the Weber, Schwabach and Rinné tests had a normal air conduction of 115 seconds, and a normal bone conduction of 40 seconds. This gave a positive Rinné of 45 seconds).

Examination for Spontaneous Nystagmus: When looking straight ahead at a small fixed distant object there is a fine spontaneous, rotary nystagmus to the right of small amplitude and slow occurrence (1 m.m. in extent and occurring about every 7 seconds).

Galvanic Labyrinthine Test—Right Ear: Two ma. of kathodal current increased the existing nystagmus; 5 ma. of anodal current caused the spontaneous nystagmus to swing to the left.

Left Ear: Four ma. of kathodal current changed the existing spontaneous rotary nystagmus to the right over to the left. Two ma. of anodal current increased the existing spontaneous nystagmus.

Rotational Tests: After ten turns to the left with the head erect, the patient had a horizontal after-turning nystagmus to the right lasting 20 seconds. Afer ten turns to the right, with the head erect, the patient had a horizontal after-turning nystagmus to the left lasting 15 seconds.

After ten turns to the left with the head forward 90,° there was produced a rotary after-turning nystagmus to the right, lasting 19 seconds. After ten turns to the right, with the head forward 90,° there was produced a rotary after-turning nystagmus to the left lasting 13 seconds.

Sensation of the face to heat and cold, normal and equal on two sides. Patient has slightly increased power of closing left upper eyelid, over that observed at the time of the first examination. There is less droop to the left side of the mouth.

The patient reported once each week for observation. She returned to her position as stenographer five weeks after injury.

The last examination, made six months after the injury, gave the following results:

Functional Hearing Tests—Right Ear: Conversational voice, 8 meters plus; whispered voice, 6 meters; akumeter, 6 meters; Schwabach, lengthened, 8 seconds over the normal; Rinné, positive, 30 seconds; air, normal; the low C (64) and the high C (2048) forks were heard a normal length of time by air.

Left Ear: Conversational voice, 8 meters plus; whispered voice, 4 meters; akumeter, 6 meters; Weber was lateralized to the left side, even when the fork was 2 inches to the right of the median line. Schwabach, lengthened, 11 seconds; Rinné, positive, 15 seconds; air conduction, shortened, 17 seconds; the low C (64) fork was shortened 10 seconds to air conduction; the high C (2048) fork was heard normally by air conduction. (Fork used in making the Weber, Schwabach and Rinné tests is a C256 D.V. (without weights), weighted. Air is heard normally, 110 seconds; bone conduction, normally 70 seconds.)

With a 2 m. speaking tube in the right ear and the noise producer in the left ear, patient heard whispered speech 100 per cent correctly, even when the lips were twelve inches from the mouth of the tube. The small A (435 D.V.) was heard 8 inches from the mouth of the

tube. With the 2 m. speaking tube in the left ear and the noise producer in the right ear, patient heard both whispered and the small A (435 D.V.) fork 100 per cent correctly, even when the lips were 8 inches from the mouth of the tube.

Examination for Spontaneous Nystagmus: There is a fine rhythmic spontaneous nystagmus to the right, rotary in type, of small amplitude and slow occurrence (1 m.m. in extent and occurring about every 7 seconds). When the patient looked straight ahead and at a small distant fixed object.

Galvanic Labyrinthine Test—Right Ear: Two ma. kathodal current increased the existing nystagmus. Four ma. of anodal current caused the spontaneous nystagmus to swing to the left. *Left Ear:* Four ma. kathodal current changed the existing spontaneous nystagmus to the right, over to the left. Two ma. anodal current increased the existing nystagmus.

Rotational Test: After ten turns to the left, with the head erect, a horizontal after-turning nystagmus to the right was produced, lasting 21 seconds. After ten turns to the right, with the head erect, the patient had a horizontal after-turning nystagmus to the left enduring for 17 seconds.

After ten turns to the left, with the head forward 90,° there was produced a rotary after-turning nystagmus to the right, lasting 15 seconds. After ten turns to the right, with the head forward 90,° there was produced a rotary after-turning nystagmus to the left, lasting 15 seconds.

These various tests have been made each week since the injury. There has resulted a considerable improvement in the hearing of the left ear over that found at the first examination. There is a restoration of power to approximate the left eyelid. Corrugation of the brow shows less power of the left side than that of the right. Slight asymetry of the lips during attempts to pucker the mouth.

This is a case in which there has been a fracture of the base of the skull, involving the petrous portion of the temporal bone, but without over-riding of the edges of laceration of the dura.

This diagnosis is based on the following facts:

a. History of a fall and bleeding from the left ear.

b. Diminished hearing in the left ear; the presence of blood in the middle ear cavity at the time of the first examination.

c. The presence of a spontaneous rotary nystagmus toward the side opposite to the injury.

d. Diminished reactibility of the nonacoustic labyrinth as evidenced by the diminished after-turning nystagmus.

e. The progressive improvement of the facial paralysis.

1724 Spruce Street.

REPORT OF A CASE OF INFLUENZA SIMULATING SINUS THROMBOSIS.*

DR. LOUIS BAER, Philadelphia.

M. W., male, age 7 years, was seen on Jan. 1, 1926, complaining of pain in both ears. Within the last three years he had two attacks of acute otitis media of right ear, complicating severe colds. The drum in the previous attacks ruptured spontaneously, the ears ceased to discharge within a few weeks after the onset. In August, 1925, I removed his tonsils and adenoids. The family physician urged the operation, not so much on account of the sore throat but chiefly because the child was never up to par. He looked anemic, caught colds frequently. The tonsils were not large, but badly diseased. A great deal of adenoid tissue was removed. After the tonsillectomy he improved considerably.

On Dec. 29, 1925, he contracted a severe cold, for which he was attended by his family physician. I was called to see him on Jan. 1, 1926, because of severe pain in both ears. I found both eardrums markedly bulging, some tenderness over both mastoids. Nasal and pharyngeal mucosa inflamed. Both eardrums were incised under local anesthesia. A great deal of mucopus came out. On the following day both ears discharged well, temperature was about normal and patient was comfortable. He was under my care until Jan. 12, 1926, when I discharged him cured. Both eardrums appeared to be normal.

On the morning of Jan. 29, 1926, the boy had a mild chill, followed in the afternoon by a temperature of 103.° On Jan. 30 he complained of severe pain in the right ear. I found the right eardrum bulging, marked tenderness and edema over mastoid. Left eardrum only slightly injected, otherwise normal. The right eardrum was again incised and a thick pus came out under pressure. The following day, Feb. 1, the temperature was 103,° swelling of the right mastoid increased, which was very tender. On the same day I admitted him to the Mt. Sinai Hospital. Blood examination showed W. 22,400, P. 82 and S. 18. Urine contained small trace of albumin. X-ray of the right mastoid showed cloudiness over all cells and necrosis around the tip. Feb. 2, I performed a simple mastoid operation, assisted by Dr. Fisher. Mastoid cells were very pneumatic, a great deal of destruction found around the tip. Sinus plate was exposed but looked healthy. Dura was not exposed. The pus of the mostoid wound con-

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tained staphylococci. Patient rallied from the operation. The following day the temperature dropped to 99.5,° patient was comfortable, but to my surprise I discovered a measly rash all over the body. He was immediately removed to his home. On Feb. 5 his temperature became normal and stayed normal thereafter. On Feb. 6 the top dressing was changed and on Feb. 8 the wound was redressed, which appeared to be in good condition. The rash disappeared on Feb. 10, and on Feb 12 the patient was allowed to get out of bed. The wound was dressed daily, filling up with healthy granulations, some mucus but not pus was present. The right ear was completely dry, the eardrum assuming the normal color and the general condition of the patient was good.

On the morning of Feb. 21, nineteen days after the mastoid operation, patient got up with a severe frontal headache and was nauseated. At 2 p. m. the same day he had a chill lasting for about fifteen minutes, followed by a rise of temperature to 104.° At 9 p. m. he began to perspire, temperature subsiding to about 99° at 5 a. m. The following day he again had a chill at 3 p. m., lasting for about fifteen minutes. Temperature rose to 105.4,° pulse 130. Severe frontal headache, nausea, but no vomiting. At 8 p. m. he began to perspire, temperature dropping. The mastoid wound looked good, right eardrum only slightly injected. Left eardrum normal. Nose and throat, except for some congestion of the mucous membrane, were normal. There was no pain over the right mastoid in the region of the emissary, nor was tenderness elicited along the course of the right jugular vein. Pressing on the left jugular—healthy—did not make the headache more severe. There was no spontaneous nystagmus. No rigidity of the neck. Kernig's sign was absent; cervical glands not enlarged. The family physician, who is a pediatrician, insisted that the child is suffering from influenza, stating that he had three similar cases under his care and that an epidemic of influenza of severe nature was present in that vicinity. Chest and gastrointestinal tract after repeated examinations were found to be normal. Mentality was good. For the next five days, the same process was repeated. Chills lasting ten to fifteen minutes at about 3 p. m., followed by a temperature ranging between 104-105,° prespiration at about 8 p. m. when temperature dropped to about normal in the morning. Blood examination on the fifth day of fever showed a W. 14,000, P. 80, S. 20. Widal was negative. Urine contained a trace of albumin and few casts. The parents absolutely refused to send the boy to the hospital, nor was permission given to take blood for a culture. On February 28, 1926, when even the family physician began to show

signs of anxiety, I informed the parents that unless the child be hospitalized, to be able to make a complete study, I would resign as physician in charge, as the patient seemed to lose ground. He was very weak and emaciated and although other signs were absent, I thought that I was dealing with a case of sinus thrombosis. Upon the suggestion of the family physician, Dr. MacCuen Smith, was called in consultation on March 1, 1926. Dr. Smith concurred with my opinion that the patient should be hospitalized for observation. The temperature course is not sufficient in this particular case to permit exploration of the sinus, as the mastoid wound by that time has almost healed up. If, however, the temperature continues for a few more days, surgical interference will be indicated. It just happened, a coincidence which in my experience only consultants are blessed with, that on that day the child had no chill, although the temperature rose to 102. The parents insisted on having the child home for another day. The following day the highest temperature was 100.° The day after, the temperature was normal and stayed normal thereafter, for which credit was given by the parents to the consultation. Within ten days the child was completely well. The wound was healed, right ear drum appeared normal.

What happened to the child from Feb. 21 to March 2 is only a matter of guesswork. The diagnosis of influenza was made by exclusion. The presence of an epidemic and the family physician's statement that he treated similar cases. The case would have been more thoroughly studied were the patient hospitalized. No blood culture was taken, nor was an eye examination made, although their negative findings would not have helped us. We all had seen cases of thrombosis with negative cultures. Papilledema or optic neuritis is only present in 15 to 20 per cent in sinus thrombosis.

The question, however, arises: is there a possibility for the lateral sinus to become infected nineteen days after a mastoid operation, in the presence of a normal course following the operation and with no visible change, either in the mastoid wound or in the middle ear? Our personal experience of four cases at the Mt. Sinai Hospital and two cases at the Methodist Hospital and from a study of literature, I have come to the conclusion that where sinus thrombosis is a complication in the presence o middle ear disease and necrosis of the mastoid that the lateral sinus is infected at the very onset of infection of the ear. When sinus thrombosis is present, the infection is of such a nature, so severe and spreads so rapidly, that infection of the ear, mastoid and sinus occurs almost at the same time. In the six cases that came under our personal observation, the symptoms of sinus

infection manifested themselves, in three cases before the mastoid operation, and in the other three cases immediately after the operation. The blood culture was negative in four cases. In fact, from a review of literature, I am inclined to think, though not without any hesitancy, that infection of the lateral sinus is not due altogether to extension, but also to direct infection. The invading organism attacks the ear, mastoid and sinus at the same time (it is perhaps too strong a statement, and it is open for discussion). When sinus thrombosis occurs in a chronic suppurative middle ear it is always associated with an acute exacerbation, which means reinfection. Neuman states that complications of nasal or otitic origin always occur during an acute exacerbation, when there is reinfection of some severe nature. In our case the ear and mastoid were in good condition. Hastings reported a case of thrombosis of the left lateral sinus long after an operation on the mastoid, which was completely healed. But in Hasting's case the patient had a very recent operation on the lateral sinus of the opposite side—right side. The right sinus was opened, clots were removed, but no bleeding was obtained from the torcular end. Therefore it is believed that the clots extended to the torcular, infecting the other side. Whitehead has reported a similar case.

The possibility of primary lateral sinus thrombosis was considered in our case. Many cases of sinus thrombosis in the presence of middle ear disease and with a normal mastoid are reported in the literature. Maybaum reported a case of primary jugular bulb thrombosis where the mastoid was found to be sclerotic, with no necrosis, and the drum head slightly injected, but otherwise normal, with a history of a recent otitis media. Those cases, however, had definite signs and symptoms of infection of the sinus. Those patients had to be operated upon before recovery took place.

Day reported six cases of spontaneous cure of unrecognized thrombosis of the lateral sinus, not suspected until found accidentally during the operation on the mastoid. The exception in those cases was also that four patients ran an afebrile course. Two cases with fever, the temperature was neither high nor did it present the characteristic septic picture. The infection in all probability was of a very mild nature. Our case had a definite septic temperature for seven days, with recovery. Headache was generalized, with no pain over emissary, nor tenderness over the jugular. There was no acute exacerbation affecting the ear or mastoid, and with other studies lacking in the presence of an epidemic running a septic course, I am inclined to believe that it was a case of influenza.

1830 Pine Street.

IS THE EXENTERATION OF THE LABYRINTH JUSTIFIABLE IN THE ABSENCE OF LABYRINTHINE SUPPURATION? A CASE REPORT.

Dr. George W. Mackenzie, Philadelphia.

The condition of the patient in the case to be reported is not so rare as would seem on first thought. Almost every otologist of some years' experience in the treatment of middle ear suppurations, especially those complicated with cholesteatoma, can recall having seen one or more cases in which the most troublesome and persistent symptom was vertigo that tended to subside after a few cleansing treatments, only to recur after neglect of treatment. In a case of this kind one would hardly feel justified in opening and draining the inner ear. Instead, he would think of operating after a more conservative method, that is by limiting the operation to the mastoid and middle ear, in order to obtain more permanent drainage and ventilation than is possible by mere cleansing treatments, which were effectual in relieving the vertigo, for brief periods only.

It is the fear of destroying hearing that deters most of us from operating the inner ear in cases of this kind, even though we know that by destroying the inner ear, we can bring about permanent relief of the vertigo. The relief is accomplished by substituting a permanently fixed loss of vestibular function on one side, that will be compensated after a few weeks, for recurring attacks of irritation (congestion) of the labyrinth of variable intensities, with its concomitant subjective symptom—vertigo.

It was this fear of destroying hearing that caused the writer to refrain from including the labyrinth at the time of the first operation. It was only after six years of intensive suffering with vertigo that the writer felt impelled to operate the inner ear. The results were eminently satisfactory to the patient, notwithstanding the fact that she suffered an unpleasant complication in the form of erysipelas a few weeks following the operation. The records of the case covering these six years are voluminous, much of which will be omitted. This abridgement the writer feels can be done with no risk to the accuracy of this report.

The case, Mrs. H. S., age 45 years, was referred by Dr. H. M. Gay, of Philadelphia, April 23, 1919, with a history of discharge from the left ear that had started four months ago. The patient

thinks the hearing in that ear was somewhat affected before then. She had an abdominal operation several years ago and since that time has nervous spells. She feels as though she was "going to pieces." She complains of a sensation of pitching forward. Dr. Gay referred the patient in order to learn whether or not the pitching sensation has any connection with her ear condition. She complains also of a heavy pressure in the back of the head, like a "dead weight," which is very distressing.

FUNCTIONAL HEARING TESTS.*

Right Side		Left Side
	Weber	Indifferent
Lengthened 5″	Schwabach	Lengthened 15″
+25″	Rinné	—10″
Normal	C_1	Short
Normal	c4	normal
Normal	Air	Short 35″

Spontaneous Nystagmus: There is spontaneous nystagmus to the right when the patient looks to the extreme right; and to the left when the patient looks to the extreme left. The nystagmus to the two sides is of equal intensities and is of about the same intensity as that found in normal individuals. There is no nystagmus when the patient looks straight ahead.

The Caloric Test: Syringing the left ear with cold water, with the head erect, after a brief period (less than one minute) produces a rotary nystagmus to the right, which is promptly stilled by syringing the ear with warm water.

Otoscopic Examination, Right Ear: The drum membrane is intact, brilliant, normally translucent, in that the long process of the anvil is quite discernible. The membrane moves normally with the Siegle instrument. With Politzer inflation the membrane moves normally over a large area and goes back to its primary position promptly.

Left Ear shows the presence of purulent secretion in the canal which is somewhat offensive in odor. Following its removal there is a large heart-shaped perforation of the drumhead.

The patient was sent to Dr. Walter C. Barker, of Philadelphia, for an X-ray examination of the mastoids. His report under date of May 2, 1919, reads as follows: "Roentgen examination of the left mastoid compared with the right: The mastoid on the left side casts a shadow more dense than that upon the right side and the cell lines are blurred. On the left side the anterior ethmoids are more dense than upon the right side."

*The Weber, Schwabach, Rinné test and the test for air conduction were all made with the 256 D.V. fork with weights attached, making it a 192 D.V. fork, for which the audible vibrations are normally 70 seconds by bone and 110 seconds by air conduction.

Between the time of her first visit on April 23, 1919, and May 7, 1919, the patient was given thorough cleansing treatments on five different occasions at the office and she was given solutions of hydrogen dioxid for home use, the effect of which seemed to ameliorate the dizziness and otherwise make the ear feel more comfortable. However, in the presence of the X-ray findings it was felt that an operation was indicated. Accordingly it was done May 7, 1919. On opening the mastoid the bone appeared to be eburnated, as it frequently is in the case of chronic mastoiditis, and the antrum was very small. The aditus ad antrum region contained a pea-sized cholesteatoma. The operation was continued radically after the method of Küster-Bergmann. The anvil was missing. The hammer was removed. The presence of the cholesteatoma in the region of the tegmen antri and tegmen tympani made it necessary to expose the middle cranial fossa for an area about the size of a dime. The sinus and dura of the posterior fossa were also exposed. On account of the extension of the cholesteatomatous matrix toward the posterior semicircular canal, it was not all removed for fear of opening the inner ear. The external semicircular canal was exposed almost to its smooth end, and was found to be intact. The middle ear cavity was thoroughly curetted, excepting the median and posterior walls. The Eustachian tube was filed. The tip of the mastoid was removed; plastic after Panse; iodoform gauze dressings applied to the wound cavity; outer loose plain gauze dressings and bandage.

The immediate result of the operation was good, in that the wound healed well after the usual length of time required for healing in such cases. Two days after the operation the patient reported improvement in the vertigo. On succeeding days she reported continued improvement, with slight improvement in the vertigo and then again she reported decided improvement in the vertigo and the headache. The discomfort in the head seemed to go hand in hand with the vertigo and when one was better the other was too.

The improvement continued until June 3, 1919, when she reported feeling well that day, but had felt less comfortable the night before. Following this there was a period of improvement again until July 23, 1919, when she reported having dizzy spells which she attributed to the hot weather and cooking over a hot stove. The ear was cleansed thoroughly at this time, following which there was a period of improvement that lasted until Aug. 22, 1919, when she reported some dizziness again, especially after turning the head suddenly. At this visit the ear was again cleansed *thoroughly*, following which

there was another period of marked improvement in the vertigo and comfort about the head on the left side.

Her condition continued much the same without showing signs of complete disappearance of symptoms. If there was any change it was rather for the worse. The subjective evidence pointed toward the presence of congestive attacks of the labyrinth that would come and go irregularly. It so happened that at the particular times she was examined at the office, and that was quite often, she was free of vertigenous attacks and for that reason the labyrinthine tests were negative; until one day she reported whilst in the throes of an attack when the signs (vertigo and spontaneous nystagmus) were unmistakably present and quite pronounced.

On April 9, 1920, the patient reported that she had been quite dizzy, she complained of many symptoms, some were relevant, but more were irrelevant. Various labyrinthine tests were made at this time, most of which resulted in negative findings. About this time the case was gone over carefully from the neurological as well as otological standpoint. Neurologically, everything was negative. The functional hearing tests were again made and revealed about the same findings as before the operation.

The galvanic test revealed slightly decreased irritability of the left vestibular inner ear.

The patient's visits were made at wider intervals, due probably to the fact that her condition became more or less fixed. When she neglected attention to her ear she would become worse, in that the vertigenous attack would come on rather more severely and with it an unpleasant fullness in the head and a train of nervous symptoms that would eventually turn to mental depression.

In 1921, she paid but one visit.

March 13, 1922, she reported that she had been comparatively well for a while until three weeks ago, when she became very dizzy and "now it is affecting the stomach." She visited her family physician, at this time Dr. Chas. H. Tait, who reported that she had been running a high blood pressure. He thought the left ear did not look so good and sent her in because of the present ear condition. The patient reports that she has been having an intermittent watery discharge from the left ear; that she is having considerable vertigo and during the attacks she sees poorly, and this causes her to "trip over things." Visual tests did not bear out the patient's statement of seeing poorly. The tendency to trip over things was no doubt due to the equilibrium disturbance that goes along with vertigo rather than to any visual defect or eye muscle imbalance. Nevertheless,

examination of the eyes, including a refraction, was advised and accepted. Structurally, the eyes were found to be normal, the glasses she was wearing were not far wrong, and the behavior of the eye muscles normal.

She was given careful cleansing treatments for the ear twice weekly for several months, with more or less satisfactory results. She felt better for the entire period she was receiving them; but it became evident to the writer that conservative treatments merely ameliorated her condition for the time being and offered no promise of a permanent cure. The family physician was so informed.

There were periods when the patient would break away from the writer's treatments and go back to her family physician for a while and then back to the writer and so on. During the whole time there was a complete understanding all around.

At wide intervals the patient would manifest a pronounced mixed form of nystagmus toward the side of the lesion, with severe vertigo for a short period, indicating an attack of congestion of the inner ear. After lying down quietly for about ten minutes or more, the attack of vertigo would disappear and with it the nystagmus. As time progressed the inner ear grew more and more sensitive to the application of heat and cold. In fact, it became so sensitive that a few drops of hydrogen dioxid at 80° F., dropped into the left ear, would cause severe vertigo, accompanied with pronounced nystagmus and upon changing the temperature to a few degrees above body temperature the nystagmus would reverse its direction. This sensitiveness to thermic changes became so acute that the mere blowing of cool air into the canal of the ear would cause dizziness, with nystagmus. The fistula test was made on several occasions and each time found to be negative. In other words, compression of air in the external canal and middle ear did not produce nystagmus or vertigo, neither did the aspiration of air. The Gelle bag was used for the purpose.

It was the hypersensitiveness to heat and cold referred to above that hindered us considerably in the conservative treatment of the ear condition. Scaly white cholesteatomous masses would collect in the depths of the ear and to soften them, preliminary to their removal, naturally required the application of solutions. To cleanse the ear and do it without making the patient dizzy consumed a great deal of time and no little patience.

Functional hearing tests made April 22, 1924, revealed a greater loss of hearing on the left side than any time yet; furthermore, the tests revealed a mixed form of deafness, in that the bone conduction

had already begun to show signs of shortening; whilst in obstructive deafness, pure and simple, the bone conduction is longer (better) than normal.

About this same time Dr. Tait had noted an increase in the blood pressure up to 210 cystolic. The dizziness was increasing and the attacks were becoming closer and more severe and were making the patient more and more nervous and less tolerant. An operation on the inner ear was suggested, but she was not responsive. Operation was not urged, largely because of that dread most of us have of destroying hearing.

March 24, 1925: Hearing tests showed an even greater loss of hearing than a year before. It was also of the mixed type. The patient claims to have been very dizzy last week, in fact so dizzy that she was forced to take to her bed and remain there for several days.

Examination for spontaneous nystagmus shows it to be present in the rotary form to the right side when the patient looks straight ahead. The examination of hearing function with the speaking tube to the left ear and noise producer to the right ear shows a marked reduction of hearing. She was unable to repeat words spoken with a forced whisper; however, she could repeat words spoken with the ordinary conversational voice through the speaking tube.

The dizziness continued, associated with nystagmus varying somewhat in intensity from day to day. The patient's general health and nervous stability began to show signs of breaking down and the time had arrived when the writer felt it his duty to urge the patient to consent to the more radical operation of exenteration of the labyrinth. The patient finally consented and was operated April 18, 1925.

The operation was performed at the Western Hospital, Philadelphia: Typical retroauricular incision 5 c.m. long, parallel to and just behind the scar left following the first operation; separation of the soft parts from the underlying bone; the fibrous tissue filling up the former wound cavity was carefully curetted away, leaving the wound in the condition it was at the completion of the first operation. Putting it briefly, the labyrinth operation was completed after the Neumann method, with slight modification. The vestibule was entered from behind, only, after having first removed the upper surface of the petrous bone as far anteriorly as the tegmen tympanum, including with it the eminentia arcuata; and the interior surface almost to the porus acusticus internus.

Following the operation there was no untoward reaction. The highest temperature reached for the next three weeks was 99° F. The vertigo following the operation was complained of less than

that which she had suffered before; in spite of the fact that there was present the characteristic mixed rotary horizontal nystagmus of marked intensity directed away from the operated side, that is found invariably in cases of acute destruction of the inner ear from any cause.

About three weeks later, May 11, 1925, the patient developed facial erysipelas beginning on the left side at the site of the wound. The details will not be presented here, since it belongs to another chapter and is not relevant to the subject of this paper. The writer is pleased, however, to be able to report that the erysipelas cleared up entirely so that the patient's present condition is no worse for her having gone through the attack. For the same reason other features of the case are purposely omitted.

SUMMARY AND REMARKS.

1. The condition of the ear at the time the patient was referred by Dr. Gay was not that of middle ear suppuration of the acute form, as was supposed, for the otoscopic examination revealed a large heart-shaped perforation characteristic of the chronic form; besides, there was a cholesteatoma found at the operation, which was too extensive to be accounted for in a case of middle ear suppuration of only four months' duration. In other words, the case when first seen must have been one of chronic middle ear suppuration. The cholesteatoma extended in a median direction toward the posterior semicircular canal, leaving, however, the canal intact.

2. The vertigo experienced by the patient prior to the time she was first seen by the writer and that which she experienced for the next six years must have been due, taking every factor in the case into consideration, to the one and same cause, to-wit: congestive attacks of the inner ear, the result of seepage of bacterial toxins from the middle ear.

For instance, the character (rhythmic) and the direction (toward the affected side) of the spontaneous nystagmus, associated with the vertigenous attacks, establishes first the diagnosis of an irritative condition in the inner ear. The only thinkable pathologic lesion capable of producing this condition is a congestion, for all other types of lesions, including serous labyrinthitis, produce a nystagmus in the opposite direction—away from the side of the lesion. Besides, in the case of a destructive lesion it is not possible for a spontaneous nystagmus to be again directed toward the affected side in the case of labyrinthine disease pure and simple. Furthermore, the labyrinthine tests contradicted the existence of a destructive lesion and confirmed those of an irritative one.

3. The findings at the time of the first operation, May 7, 1919, revealed enough pathology in the temporal bone to warrant the pro-

cedure. Unfortunately the extension of the cholesteatoma and especially its matrix were such as to make it impossible for one to remove it all without opening the inner ear and thereby sacrificing the vestibular function and very likely the hearing also on that side. In cases of this kind it generally becomes necessary to make the sacrifice, eventually, in order to spare the patient's comfort, if not his life.

4. There are two possibilities in the case of recurring attacks of congestion of the inner ear secondary to middle ear suppuration: *A. gradual* loss of function from metaplasia of the neuroepithelium; *B. sudden* loss of function from acute suppurative labyrinthitis. This latter, more serious, outcome is fortunately rather rare. This is most likely to happen when the middle ear infection assumes an increased severity from insufficient drainage and ventilation. When danger of this kind threatened, the patient would develop an increase in the intensity of the vertigo and headache. On such occasions she would report and submit to thorough cleansing of the ear, which was followed by prompt improvement in all the symptoms.

5. Headache in the presence of middle ear suppuration should always be looked upon with suspicion, since it is a symptom common to all intracranial complications of otitic origin. The inner ear contains so many preformed ways for the spread of middle ear infection to the intracranial structures that it may, in a way, be classed among them. In the presence of an acute diffuse suppuration of the inner ear there is more or less headache from a complicating serous meningitis. In this case the inner ear was not invaded by the infecting organisms, but by their toxins. Therefore, the above explanation does not account for the patient's headache. The repetition of headaches that occurred simultaneously with the vertigenous attacks were merely coincidental and due evidently to meningeal irritation from the same general cause, namely, increased toxicity of the bacterial toxins from retention and stagnation.

6. The average individual would probably elect to have a slight remnant of hearing destroyed on one side where the fellow ear is normal in preference to the continuance of a symptom that had incapacitated him for six years. The patient at this writing is comfortable, free of vertigo and happy with the results. The writer feels that if he had it all to go over again he would act exactly as he did; that is, operate conservatively the first time and allow the patient to decide later whether he wished to have an operation performed on the inner ear to spare him the continuance of an unbearable vertigo.

1724 Spruce Street.

A METHOD OF TONSILLECTOMY IN CHILDREN.

Dr. Conrad K. Gale, New York City.

The question of tonsillectomy in the adolescent and adult has the bulk of opinion in favor of a surgical dissection of the tonsils after the method of Freer, etc. Tonsillectomy with the guillotine or snare bears its criticism because:

1. There is a liability of leaving part of the lower pole in situ, which may contain the focus of a general infection, or be the cause of recurrent peritonsillar abscesses.

2. The presence of adhesions between the capsule and the adjacent tissues complicates the procedure greatly.

3. The body of the mandible below and behind the alveolar eminence is often deeply grooved, which also hinders the operation.

4. Deep buried tonsils, especially when of a soft consistency, are at times almost impossible to be removed by this method.

The above perfectly true in the adult has influenced greatly the procedure of tonsillectomy in children of two, three, four, five and six years of age. And yet what is true in the adult is not necessarily true in the child.

Tonsillectomy in children is usually performed with the guillotine, snare, or combination of the two. In the main the absence of capsular adhesions, the question of time and the cramped working quarters are responsible for this decision. The last factor is better seen in reviewing the oral measurements of fifty adults and fifty children between the ages of two and six.

A. Distance between the incisor teeth, the mouth fully opened: Adults, 4¾ c.m.; children, 3½ c.m. Distance between the angles of the mouth, the mouth fully opened: Adults, 6 c.m.; children, 4½ c.m.

Tonsillectomy with the guillotine as it is being performed in children does not take into consideration the difference of anatomy and histology existing between the tonsil of a child and that of an adult. And so we find tonsillectomy by the guillotine as advocated for the adult being practiced on the child. Based upon these anatomical and histological differences, I wish to present a method of tonsillectomy with the guillotine, peculiar to the child.

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Embryologically about the fifth month, solid epithelial sprouts grow outward from the floor of the sinus tonsillaris into the surrounding fibrous tissue of the mucosa. These epithelial sprouts become hollow through degeneration of the central cells, and so form the tonsillar crypts. The superficial part of the tunica propria of the mucosa about these crypts develops the characteristic lymphoid tissue. The development of this lymphoid tissue pushes down and condenses the deep layers of the propria, making it form the capsule of the tonsil. The capsule hence covers the tonsil on all sides not covered by the epithelium, and so is really in the form of an irregular cup, into which the tonsil fits.

Anatomically, there exists between the tonsil and the plica triangularis, especially in the upper half, a recess, called the anterior tonsillar fossa. Between the plica retrotonsillaris and the tonsil exists a recess called the posterior tonsillar fossa.

The capsule of the tonsil at its lower pole is firmly adherent to the surrounding tissue, thus forming the root of the tonsil. Entirely different anatomical relations exist at the upper pole, which extends upward into the loose tissues of the soft palate. This loose tissue forms a cap covering the upper pole of the tonsil, and is external to the capsule. This cap may be accurately called the supratonsillar fossa, but should not be confused with the space in the tonsil below the capsule, formerly erroneously called the supratonsillar fossa. In the adult the supratonsillar fossa holds ½ c.c. of novocain on injection without pressure.

Externally the capsule is loosely attached to the fascia of the superior constrictor of the pharynx. Especially in children is the retrocapsular connective tissue of the loose areolar type.

The relation of the alveolar eminence to the tonsil is also different in the child. Here the tonsil is found to lie posterior to and slightly below the alveolar eminence. Again, the alveolar eminence is more prominent in the young. Then, in children, the bone below the alveolar eminence has usually a smooth surface downward to the lower limit of the body of the jaw.

TONSILLECTOMY BY THE GUILLOTINE.

In this operation the Ballenger guillotine is used because of its scissor handle. The guillotine should be held in the left hand in enucleating the left tonsil, and vice versa.

Thus, if the left tonsil be removed the guillotine is inserted on the left side of the mouth, parallel to the cheek; the ring in a horizontal plane flat on the tongue. In this way the guillotine acts as a tongue depressor. The small oral orifice is amply large enough for the

free manipulation of the guillotine, at the same time permitting of enough vision in the depths. In fact, throughout the operation there is only one instrument at any time in the child's mouth.

Pressing the tongue down, the guillotine is introduced until the ring lies slightly posterior to the lower tonsillar pole. The horizontal plane of the ring thus forms with the long axis (superior inferior) of the tonsil, an angle of 90 degrees. In children the tonsil lies slightly posterior to the eminence. Beginning at the lower pole of the ring of the guillotine is passed over the surface of the tonsil by simply rotating the guillotine handle 90 degrees to the patient's right. The distal end of the ring, being behind the tonsil, catches the tonsil firmly as the guillotine is now swung to the right angle of the mouth. In the present position of the guillotine there are two fixed points:

1. The shaft of the guillotine against the right angle of the mouth.

2. The ring of the guillotine, with the tonsil framed in it, pressed against the alveolar eminence. Using the angle of the mouth as a fulcrum, the tonsil, which is still posterior to the eminence, is pressed upon the eminence, thus forcing the tonsil through the ring of the guillotine. This maneuver is easily accomplished since: *1.* The alveolar eminence is very prominent in children, and the tonsil easily stems against it. *2.* The tonsil is posterior and slightly below the alvelor eminence in children, and the guillotine ring in framing the tonsil must be in the correct position to press it against the eminence. *3.* The body of the mandible below the eminence is smooth in children, thus avoiding difficulties in technique met with in the adult.

The alveolar eminence has now played its part in the technique of the operation.

With the shaft of the guillotine still fixed against the corner of the mouth, and the tonsil completely or partially through the guillotine ring, the tonsil is easily levered forward and upward from the eminence against the anterior faucial pillar. The maneuver is especially simple in children because the tonsillar capsule is loosely attached to its bed, and adhesions are very rarely present. By this movement the tonsil is still further forced through the guillotine ring, and the position of the guillotine is such that its blade is in the same plane as that of the anterior pillar.

For the first time a finger is now inserted into the mouth to press upon the anterior pillar and so to be sure that all of the tonsil is within the ring.

The guillotine is now ready to be closed. This step is very important. The guillotine should not be closed in any position but that in

which the blade on being driven home is parallel to the anterior pillar.

The guillotine should be at first carefully closed to the extent where the blade touches the junction of the tonsil and free border of the plica triangularis. With the finger still upon the anterior pillar, the guillotine is snapped shut with a quick movement. The scissor handle of the Ballenger guillotine allows of this procedure. With any care whatsoever, it is impossible to catch the anterior pillar in snapping the guillotine shut. The rational of this procedure lies in the anatomy of the tonsil.

1. The anterior tonsillar fossa lies between the tonsil and the plica triangularis.

2. The posterior tonsillar fossa lies between the tonsil and the plica retrotonsillaris.

3. The supratonsillar fossa exists between the upper pole of the tonsil and the loose tissues of the soft palate.

4. Between the capsule of the tonsil and its bed laterally exists a very loose connective tissue.

Hence, we can easily imagine surrounding the tonsil a space filled with loose connective tissue extending upward to the upper pole of the tonsil, there to widen out into the large supratonsillar fossa. Mechanically a string will break much more easily by snapping it than by a steady pull. A ball with semirigid walls will tear with a sudden rather than a gradual compression. The same principal holds true for the recesses surrounding the tonsil. The cushioning retrocapsular tissue extending into the anterior and posterior recesses and the supratonsillar fossa forms a closed system with semirigid walls, especially above the upper pole of the tonsil in the supratonsillar fossa. By closing the guillotine with a snap retrocapsular, the sudden expansion of tissue, mechanical conditions being met, will open the mucous membrane covering the supratonsillar fossa. This opening is retrocapsular. It is necessary for the success of this maneuver that the guillotine blade be not too sharp.

The above method of closing the guillotine serves another purpose. The attachment of the capsule to the tonsil is practically in the form of a semicircle. The snapping of the guillotine blade helps to invert this capsule, thus insuring its complete removal, at the same time helping to "pop" the tonsil still further through the guillotine ring.

The last step in the removal of the tonsil is to put the finger behind the ring of the guillotine and to sweep it about the margin of the ring, as the handle of the guillotine is swung upward through an angle of 90 degrees. Since in the supratonsillar fossa there is

already a retrocapsular opening, the enucleation is complete and simple. Even in those cases where the supratonsillar fossa has not been opened the thinness of its covering wall under the last maneuver opens retrocapsular, allowing of an excellent result.

In so far as the question of time is concerned the guillotine operation can easily be done within two minutes. Hence the depth of anesthesia for the child can be quite superficial, thus arriving at practically the millenium of aspiration likelihood.

SUMMARY.

Tonsillectomy by the guillotine is the preferable operation in children because:

1. The procedure is not cramped, and good sight into the depths is afforded.

2. The tonsil lies posterior and slightly below the alveolar eminence, which in turn is large; both conditions facilitating the procedure of stemming the tonsil against the eminence.

3. The tonsil can be easily levered off the alveolar eminence against the anterior pillar.

4. By snapping the guillotine shut, the correct mechanical conditions existing, a retrocapsular opening is made in the fossa supratonsillaris, which facilitates complete enucleation of the tonsil.

5. The absence of retrocapsular adhesions, and a smooth mandibular body aid in the procedure.

6. The operation can be done within two minutes, thus allowing a superficial anesthesia, and arriving at the millenium of aspiration likelihood.

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Beth Israel Hospital.

THE NEW YORK ACADEMY OF MEDICINE.

SECTION ON LARYNGOLOGY AND RHINOLOGY.

Regular Meeting, Feb. 23, 1927.

An Operating and Visualizing Sinuscope. Preliminary Report. Dr. Samuel Morse.

I present this instrument with an apology, knowing full well the overburdened armamentarium of rhinolaryngologists. However, I have been feeling the need of an instrument which would be useful in visualizing the openings of the various sinuses, and by the aid of which probing of them could be made under direct vision. I also thought it would be feasible to get such an instrument within a sinus like the antrum or sphenoid.

Value As Nasal Endoscope. There has been, to my knowledge, only two instruments which have made a step towards the progress in this direction. The antrascope of Dr. Spielberg only applied the principle of the nasopharyngoscope to a cannula, and was able to get into the antrum and visualize at right angles only. This instrument had no operating possibilities. Another instrument by Dr. Maltz, an account of which was published in THE LARYNGOSCOPE, 1925, was an improvement over Dr. Spielberg's instrument, in that it had a little more than right angle vision (20 per cent) and had the advantages of a very narrow lumen. This also had no operating possibilities.

The manner of development and actual use in my practice, particularly in sinus disease, will be enlarged upon in an article which will follow this preliminary report, and exhibition. This is now in the course of preparation.

The practical uses for the instrument are viewing and probing and instilling the sinus orifices, an aid to the thorough eradication of chronic ethmoiditis, recurrent polypi, making strong topical applications directly under view, and the visual implantation of radium seeds, in the eradication of chronic polypoid degeneration.

In the treatment of intractable antrum disease, the instrument may be inserted into the cavity and thus treated, through its accessory channel, or it may be used through a permanent opening made by one of the usual instruments for that purpose. It can be used repeatedly through this opening, for injection of fluids, fulguration within the cavity, and removal of polypoid masses, with an instrument similar to the dental broach, which I have had prepared for me, and have used experimentally on other polypi with satisfaction.

The instrument has proven of great value to me, because of its "direct in line vision" in postnasal work. (Sketch.) Recognizing such conditions as the origin of postnasal discharge, old, unhealed ulcers from recent or old adenoid removal, good view of adenoid masses and posterior tip hypertrophy. These areas may be treated or operated upon with the instrument in situ, as, for example, fulguration, radio knife work and snare. (Example sketch.)

The instrument may also be of value in the attack of hypophyseal tumor through the nasal route according to the method of Cushing. This needs further investigating, because I have had no experience along these lines. But the instrument will be put into the hands of one able to do this work.

Outstanding features of the instrument are:

1. The visualizing prismatic arrangement of its almost fly-like eye, in that it sees forward and to the sides, with its light in front; in fact, one sees through the light. This principle is adapted from the McCarthy panendoscope, but modified to suit the purpose here.
2. Seeing a large field in a small area, or a small field in a large area, according to the distance of the end of the instrument from the area viewed.
3. The displacement of the area viewed, up or down or laterally, by rotating the tube, and without moving the instrument up or down.
4. Direct image.

5. Cold illumination with porcelain-tipped bulb, to prevent injury to tissues.
6. The instrument may be revolved within the sheath, for getting the operating instrument into view.
7. A trochar attachment for entering the antrum, with the sheath. (Illust.)
8. Operating instruments, catheter, fulguration electrode for fulguration, cutting or zinc ionization within a cavity, probes, broaches and rasps. The latter two are in preparation for perfection. With the snare attachment posterior tip hypertrophy may be removed under view.

I believe that from my experience thus far with the instrument, it is of great value, as an accessory, to our examination, X-ray and transillumination methods, and am illustrating here two X-rays of sphenoiditis diagnosed by having observed, the origin of discharge from the sphenoidal openings, and corroborated by said X-ray.

When intending any operating upon the sphenoid or antrum, I advise getting a good X-ray to recognize the particular anatomy of the case in question. It is important to know the depth of these cavities.

As an aid to mapping out extent of sinuses, one can inject with small uretheral catheter, through the sinuscope, any one of the opaque X-ray fluids.

In frontal sinus disease the instrument may be used for guiding a probe or cannula.

As an aid to further convenience in the use of the sinuscope we are arranging to have the calibre of the visualizing tube reduced by 1 m.m., which, I have been informed, is still further possible, and will aid considerably in some of the very small nasal passages, that are seen occasionally.

It was with the kind assistance of Mr. R. Wappler, that my ideas have been furthered and executed.

A Double Spiral Tenaculum. Dr. W. W. Carter.

Functional Restoration in Repair of Facial Injuries (Color Photography; Lantern Slides). Dr. J. Eastman Sheehan.

In all plastic cases a photograph of the patient is a routine proceeding. Later photographs indicate the degree of correction. A collection useful in teaching is thus formed. The usefulness of the later photographs is reduced by use of dissimilar light or by neglect to obtain the same position when patient is posed. The single tone plate is faulty, in that it tends to reduce all planes to a flat surface appearance.

Coloring of lantern slides made from photographs is more convincing and makes a better essential demonstration, but is necessarily open to question as to accuracy. Direct color photography is the evident remedy if attainable, but is only practicable with plates ready for camera experts. Such plates are to be had, but perfection is not claimed for them by the makers and photographers find it difficult to obtain satisfying results. As compared with the most rapid single tone plate a much stronger light is required, and the exposure is in ratio to 60 to 1. Light action is impeded by passing through a filter and also through the glass plate, 1½ m.m. thick, the emulsion being on the farther side of the plate. The density of the emulsion impedes the passage of projecting light when the slide is complete. Hence, color photographs of unequal value, both actually and for demonstration. Nevertheless, when they are good, they faithfully reproduce colors, and when projected have not the flat appearance. Thus, in one slide shown a skin graft is seen to be of different tint from the surrounding skin, which would not have appeared from an ordinary photograph.

The value of single tone motion pictures had been demonstrated by Albee and Montague, first as presenting on a screen, 6x9 feet, a continuous view of operative procedures little visible to those trying to follow from 20 to 60 feet distance in the amphitheater the action in an operative field 4x6 inches, often obscured; and, second, as making possible a teaching collection of all cases of one kind presented over a period of years. This latter use is increased where color motion is substituted, as is now being done in Europe. There, however, the method is to use the ordinary motion picture film, to which three images are transmitted side by side (of the same object at the same time), one through a red filter, one through a blue, and the third through a green or

yellow filter. Complementary filters are employed when the superimposed images are projected, giving every shade of color and an adequate perception of depth and, therefore, of the true relations of the physical elements. The camera is installed close to the operative field and electrically controlled by the operator, who observes by telescope. The process makes possible the collection over a period, of examples of all varieties of operative procedures, an invaluable aid to study and for consultation.

In connection with the motion photographs of functional restoration shown later, it was noted that facial disfigurement involves loss other than the merely physical. In six of the seven cases there had been in ability to find employment, and in the seventh case that was expected. One patient was thought to have but a short time to live—she is now self-supporting and therefore relatively happy. Another had fled from all social contacts and had become a burden to others who could give her little—she now has a good position and takes a full share of the enjoyment of life as she sees life. A third, who believed her active career to have been definitely ended, is again fitting herself for a position as teacher. A fourth, who was about to lose her position, has had her salary raised. The three men have all found work of the kind for which they are fitted, whereas two of them had been refused work, not once but repeatedly, and the third was sure that was to be his fate. Loss of ability to make a living, forced retirement from social contacts, surrender of the expectation of marriage, produce psychic depression, and the return of these after operation sometimes conduces to satisfaction on the patient's part greater than the surgeon himself may feel.

The paper was followed by projection of single tone photograph slides, slides colored by artists, direct color photographs, and motion picture demonstration of functional restoration.

After the discussion, Dr. Sheehan expressed his thanks to the Chairman and those who had participated in the discussion. As to the criticism of the projecting machine, he assured the Chair that it had been certified for use in any hall, and regretted if through lack of familiarity with the arrangements in the new building he had unknowingly infringed upon the rule in that regard.

DISCUSSION.

Dr. Seymour Oppenheimer: I should like to present some colored photographs, the property of Dr. Bucky, made by a process which may be a little simpler than those shown by Dr. Sheehan. They show conditions of the face, such as lupus, keloids, etc., taken by Dr. Bucky with a German process which is simpler in technique and possibly demonstrates the important points quite as well as the slides presented by Dr. Sheehan, with a less elaborate procedure. The demonstration is purely for the purpose of supplementing Dr. Sheehan's presentation.

Color photography is of great teaching and recording value, and enables one to have a more accurate illustration of the condition, as it is of much more value than a black and white photograph. I think there is another process which is even of more value and that, namely, the stereoscopic photograph, as the ordinary black and white does not show the depths and dimensions. I know of no process as yet whereby colored photographs can be taken stereoscopically.

It is presentations of a kind such as the Doctor has given which does much to place before the medical, as well as the lay, mind the exact status of what constitutes plastic surgery, meaning the correction of defects, whether from birth, accident or disease, and I might incidentally say that there is probably no branch of all surgery which requires such careful attention to the most trivial details in technique and aseptis as this branch of surgery as bearing upon the end result. The plastic surgeon, in addition to his precise surgical skill, must inherently possess a geometrical conception as well as a tremendous visualization. He must have a good knowledge of contours and substructures. The end result must be in his mind's eye in planning the case before the first incision is made, even though the operative procedures planned may consist of a dozen or more stages.

I had the mistaken notion when I gave up my otolaryngeal practice to respond to the call within me to devote myself to this specialty, that I was

going to make life easier for myself, but I did not proceed very far in my investigation when I determined that flaps and circulation were associated with many anxieties and heartaches.

The scope of plastic surgery is almost unlimited in its application to an enormous variety of conditions, involving almost all parts of the human anatomy. There are, as well, an unlimited type of procedures, such as direct skin grafting, whole thickness implantations, or direct tissue transplantations from distant regions. As well, the types of flaps may be by direct regional shifting, or transference in one or more stages from a distant point. But the underlying principles remain the same.

In my surgery of this subject all over the world in the past year, I found that in spite of the fact that there is nothing new under the sun, we modernists speak of plastic surgery as a new field. Our technique, of course, has improved, and that by reason of the big impetus since the war, with its great opportunities for study, yet the history of plastic surgery indicates that many of these plastic procedures were conceived and practiced for a century or more. The two outstanding developments in recent times which to my mind are most important in its application to plastic surgery are the Gillies tubed pedicle flap, and the Esser epithelial inlay.

A point that has struck me most forcibly has probably been the lack of uniformity and standardization of methods, which, of course, can be attributed to the individual conception of the operator, but it is presentations of this kind, and others which are gradually appearing in the medical press, which will do much to establish a more definite uniformity and standardization.

DR. HENRY SAGE DUNNING: Mr. President and Members: Dr. Sheehan has given us a remarkable presentation, I think the finest that has been given before this Section for a very long while. He has shown so many things tonight that it is almost impossible for me to take up any one phase of this field surgery. I thought that his pictures were exceptionally fine and that he had an exceptionally good artist working with him, who understood what was required of him. The motion picture showing the functional results after operating was indeed very clever, and I believe motion pictures should be taken more often after operating upon these difficult plastic cases. I think his colored photograph is very excellent, the best I have seen, and I wish to congratulate this Section on having been given a chance to see such beautiful and interesting work.

Dr. Sheehan has given a vast amount of time and thought and money in this presentation this evening, and I have enjoyed his exhibition more than I can say. His pictures bring to my mind many of the difficulties that we have in the repair of facial defects from burns or from neoplasms, and I would say that the satisfactory repair of the human face is at times full of tragedy and grief. Many of the results obtained are very heartrending and disappointing to the surgeon. We found it that way during the late war and although this field of surgery has developed to a great extent, I would still feel that we have much to do in the teaching of this subject and also in the establishing of clinics where more epople can receive the care and treatment that Dr. Sheehan and others can give them.

We have not enough men of the type of Dr. Sheehan who have the heart, time and the patience to devote to this most difficult branch of surgery. Nobody can afford to go into this type of work unless he is willing to devote himself to it most conscientiously.

DR. DOUGLAS QUICK: I think I am the last person to discuss this subject, since most of my surgery is of a destructive rather than reconstructive character. Two or three points, however, have occurred to me. In my own work with destructive scar tissue formation, following the use of radium, I have had ample opportunity to be able to endorse Dr. Sheehan's point of getting rid of all scar tissue, no matter how extensive the resulting defects. It is amply repaid later on. Some of the medical effects at repairing these defects are worse than useless. The very wide excisions of scar tissue are absolutely necessary before starting the reconstruction proper.

Another thought occurred to me in connection with Dr. Oppenheimer's remark that none of this work was new. That may be fundamentally correct.

It is only by taking infinite pains and paying every attention to details that improvement in technique will result. Take, for taxample, the recent work of Dr. Ferris Smith. By very careful measurements with a mercury manometer, he has been able to estimate exactly the amount of pressure necessary to hold a graft in place so that healing will go on most advantageously and with the highest percentage of takes. This is work of tremendous value and while it may not be fundamentally new, it is, nevertheless, a very great advance in the accuracy with which plastic work can be carried out. Another point of importance in the present-day plastic surgery is the fact that a few men are now devoting all of their time to it. It is true that a certain number of very well known men have done very excellent work in plastic surgery as an offshoot of their general work. It is only more recently that men are devoting their full time to this one specialty, and, in my judgment, it is a full-time job. Dr. Sheehan, along with a few other gentlemen, are devoting their full time to it, and are to be commended most highly for so doing.

DR. C. R. STRAATSMA: Dr. Sheehan has brought out two rather important points in regard to colored photography. It has been said that photographs don't lie, but most of us can make them lie very much. For instance, if there is a scar on the face, you can by taking a picture with proper focus and lighting bring out every detail. Then you remove same with little or no improvement. In taking a second picture, one can show a beautiful result by using soft lights and an improper focus. The ordinary photograph, then, unless you know the author, means very little. Colored plates have a very definite and standard technique, and hence do away with doctoring-up results, and give a fairly honest result. The second point is that the technique is generally the same for each picture. Every surgeon should keep some record of the conditions under which the original photograph was taken, noting distance from camera, lighting, exposure, etc., so that when he takes the various stages and final result they will be under the same conditions and will show the actual progress and results. It is very important that some method be worked out whereby all pictures may be standardized for *each case*.

DR. HERMAN GOODMAN: My remarks will be limited to the subject of photograph. As a dermatologist, graphic presentation is as important to me as to the plastic surgeon. The impression one receives from the exhibits of Dr. Sheehan is that it is the result of professional photography. If I am in error, it is gratifying to know that such excellent work is being done by an active practitioner.

Color photography is very difficult. Not every picture which is taken is successful. The time of exposure of the plate is much too long to permit of color photographs of motile organs such as the tongue. The cost is very high. Colored plates are good, but one must depend on the one who paints in the colors on the outlines of the ordinary black and white plate which is developed especially for coloring.

The ordinary black and white picture must suffice for most of us. We can get prints and lantern slides. One must have the proper equipment. The most important is proper light. The first essential of proper light is: enough of it. I doubt if one 1,000-watt incandescent bulb is enough. In dermatology we have mercury vapor arc in quartz, and carbon flame lamps which are utilized in photography, and which may be likewise used in photography.

Then the lens must fit the purpose. We use long-focus lenses, but we insist on sharp definition. The fast-portrait lenses, such as Bausch and Lomb, 4.5 F. Tesser, may be used if stepped down, or the Goerz Dagor at 6.8 F. is used for the same work.

The camera one uses depends on the character of the work. It is important in clinical work to get definite images as to size. Thus in my camera I have 22 inches of bellows. I have made a mark on the extension rod to mark off the point at which I have a full size image on the plate; another mark to indicate half size; and a third mark for full length pictures. Thus my pictures are always relatively the same size.

The background should be darker than the subject. In some pictures the white back room, as from the tile of an operating room, makes all the patients swarthy—almost negro.

Extraneous things should be deleted. Hospital gowns and clothing should not detract from the subject. I am not overfond of blocking out. I would rather use opaque.

Stills may be shown on moving picture stock. To use it on cinema reels is too expensive. One may use a simplified projector of single frame on movie stock as developed by Bausch and Lomb. An entire lecture, which previously required a carrying case and stereopticon projector, may now be carried in the side pocket of the coat, including the projector. The cost is much less than that of lantern slides. The disadvantage is that the order of the projection is less labial.

In my work, I have used standard gauge movie stock. The cost of negative development and negative is tremendous. Then one must have a standard gauge projector; make provisions to comply with fire laws; have a licensed operator; and nearly always must have a fireproof booth. I am now doing all my work under the 16 m.m. film. This is relatively inexpensive. My nurse can follow the operator and run the carema. The projection may be anywhere and any time that there is current available. The stock used is approved by the fire underwriters. There is no need for professional operators, as anyone may learn to operate the projector. We have had considerable experience with narrow gauge (16 m.m.) stock and recommend it.

The place of the moving picture in the study and practice of medicine and surgery is an important one. In brief, the possibilities of extended utilization of this invention may be outlined as: prevention of disease by instruction of lay audiences; the medical student, the interne and the doctor in his office; further, the moving picture is a graphic truthful record to show the progress of the patient, and as legal testimony. Also, the moving picture may be used for the doctor to review his work in order to improve his technic.

The most practical suggestion I have to make is that the doctor knows what he wants on the film, and that it is easier to teach a doctor to take cine, than to teach an operator medicine and surgery.

SECTION ON OTOLOGY.

March 11, 1927.

Eight Cases of Radical Mastoid Operations with Secondary Skin Graft. Dr. J. Morrisset Smith.

The cases were presented merely to show the results. The grafts were put on five days after operation and allowed to remain for five days untouched, after which they were dressed every day. The healing time was six weeks. The tubes were dry as presented.

DISCUSSION.

DR. FRED WHITING: These are the most beautiful results I have seen for a long time; it is a most creditable exhibition. I am filled with admiration for the courage displayed by Dr. Smith in lowering the facial ridge to the extent displayed in some of the cases. His accurate knowledge of anatomy has contributed greatly to the benefit of his patients.

A New Aid in the Diagnosis of Mastoiditis. Drs. Friesner and Rosen.

(To appear in a subsequent issue of THE LARYNGOSCOPE.*)*

DISCUSSION.

DR. MAYBAUM: Those of us who are associated with Dr. Friesner have been tremendously impressed with the importance of this method of diagnosis. We feel that Dr. Friesner's original work of determining the calcium content of pus from the middle ear marks a definite contribution to the diagnosis of acute mastoiditis, especially so in doubtful or obscure cases. Time and again these determinations tallied with the findings found at operation. It is nothing unusual for us to request this examination in many of our suspected cases of mastoid involvement, which we see not only on the ear service but in other services at Mt. Sinai Hospital. At times it has been of help in deciding

whether or not to do a bilateral mastoidectomy—cases in which there was some doubt as to whether or not one of the mastoids was involved.

While we realize that one should be conservative at present in coming to a conclusion as to the value and all-importance of this aid in diagnosis, we cannot escape the feeling that this discovery has great promise. Dr. Rosen's work with Dr. Friesner deserves the highest commendation. He has applied himself conscientiously in studying some of the practical aspects of the subject.

DR. LEE WALLACE DEAN: We have made twenty observations since Feb. 24. They confirm the opinion which you expressed to me when I was in New York City. Our observations indicate that the greater the bone absorption, the higher the percentage of calcium in the pus. The largest amount of calcium in pure pus was found in cholesteatoma of the mastoid, and one from an abscess from the bodies of the vertebrae. Naturally, no definite conclusions could be deducted from our small number of observations, but Victor Myers states that so far as they go they confirm your findings.

DR. D. D. VAN SLYKE: I can only congratulate Dr. Friesner, Dr. Rosen and Dr. Kuttner for developing this method. We have had no experience with it yet at the Rockefeller Research Institute, but we have been working on the question of calcium in the blood, and these investigations are interesting from that point. Hastings and Sendray have found that the blood serum ordinarily contains all the calcium it can dissolve; when shaken with calcium phosphate and carbonate it does not take up any at all. Here we have cases where the pus contains two or three times as much calcium as the plasma can hold in solution. The question naturally arises concerning the mechanism by which the pus takes up so much calcium. Have the cells ingested the calcium or caused the plasma to dissolve it? Is the calicum in true solution or in the form of suspended particles, either in the plasma or in the pus cells? If it is a true solution, the attack on the bone may be made chiefly by solution of its calcium salts, while if the calcium is in the form of suspended particles in the pus one would be more inclined to assume that the latter attacks the organic matrix on the bone.

DR. MICHAEL HEIDELBERGER: There is very little that another chemist can add. I had in mind raising the same questions that Dr. Van Slyke mentioned, but it would be futile to repeat them. I am very happy to join him in congratulating Dr. Friesner and Dr. Rosen on the clever idea which has apparently been brilliantly confirmed by the clinical results.

DR. THEODORE KUTTNER: The idea which occurred to Dr. Friesner concerning the calcium content of pus is not only very clever, but highly interesting and valuable. It is strange that no one has thought of this before, but that perhaps is due to the fact that we are accustomed to using very large amounts of material for chemical examination. Even twelve or fifteen years ago it was customary to use 50 or 100 grams of any material for chemical examination, and it is only in more recent years that we are able through the advances of microchemistry to examine and analyze very small amounts. It was due to the efforts of such men as Pregle and Bang in Europe; Folin in microcolorimetric methods in this country; Haldane in England; and Van Slyke in this country, in gasometric methods. Dr. Van Slyke's contributions to medical science are invaluable.

We are greatly indebted to microchemistry for much of the recent advances in medicine, in clinical diagnosis and treatment of diseased conditions.

In the examination of pus in otology often very little material is available, and it was therefore necessary to devise a method which would take care of very small amounts with reasonable accuracy. The method which is soon to be published will allow the use of 0.1 c.c. of pus with a calcium range of about 2.5 m.gms. to 72 m.gms. per 100 c.c. of pus. The actual amount of calcium in each test could vary from 0.0025 m.gm. to 0.036 m.gm.

I have had occasion to watch the progress of the work in the laboratory and have made several of the tests myself. I have checked up the method, using the Dubosc colorimeter for larger quantities of pus, and compared the present method we are using with that of Kramer and Tisdal's titration method, which they devised for 2 c.c. of blood plasma. For the smaller quantity of pus which is ashed, the calcium is estimated by a colorimetric method, using the Kuttner

microcolorimeter with a permanent standard. This instrument was described in the *Journal of the A. M. A.*, July 17, 1915.

In regard to the question raised by Dr. Van Slyke as to the nature of calcium in the pus, that is a very interesting point, and probably part of the question I might be able to answer from the following experiment: Dr. Rosen and I centrifuged some pus, of which we were able to get a rather larger quantity, from a case of osteomyelitis of the femur. We obtained two layers, one of cells and a supernatent layer of fluid. The curious part was that the cells contained 8 per cent less calcium than the supernatent fluid. This would point to the fact that comminuted, small particles of bone are not carried by puss cells and would lead one to assume that bone could be absorbed by the serum of the pus and the calcium exists in the colloidal state or at least a large part of it.

At the present time we are therefore careful; we burn off the pus in a small platinum dish and examine the calcium in the ash, colorimetrically.

I thank the Society for their kind invitation and I am very happy to have been of service to Dr. Friesner and Dr. Rosen in their valuable work.

DR. HEIDELBERGER: In the last few months Dr. Van Slyke and Dr. Sendray have published a method for the determination of calcium in the Van Slyke gas machine. This method can undoubtedly be used for somewhat smaller amounts of calcium than the Kramer and Tisdall method; so that anyone who wished to test out Dr. Friesner and Dr. Rosen's idea before Dr. Kuttner's method is published might avail himself of the Van Slyke method.

DR. YANKAUER: Dr. Friesner has very modestly told how he came to think of this idea of estimating the calcium content of mastoid pus. In reality it was because he was constantly working and thinking about mastoid inflammations that he finally came upon this discovery; and if the definition of genius, "a capacity for taking infinite pains," is true, then we may call this discovery a stroke of genius. Like all such discoveries, it is very simple when made. It is so very obvious that anyone might ask "Why did not I think of it?"

The method of examining pus chemically for clinical data is something entirely new, so far as I know. This method therefore opens up an entirely new field for clinical research. Hereafter we must take into consideration the calcium content of pus from the mastoid, from the accessory sinuses, or from other inflammatory conditions; it opens a new era in the diagnosis of suppurative conditions, and we can therefore characterize this discovery of Dr. Friesner's as an epoch-making one. The actual work of making a calcium content determination is tedious and laborious. It took a long time to make each of the tests. Through the able help of Dr. Heidelberger and Dr. Kuttner it was possible to simplify the chemical examinations, so that now they can be made with sufficient ease to make the test useful as a clinical method. Nevertheless, the amount of labor involved in making determinations in over 100 cases—and not only one, but numerous determinations in each case—required a degree of enthusiasm, energy and diligence which well befits a young man who seeks to win the approbation of his older colleagues. These qualities Dr. Rosen has manifested to a high degree.

In order to evaluate the possibilities of the calcium content determination in pus we must first place before ourselves a clear idea of exactly what the cacium test does. So far as the observations are understood, the test shows that when an abscess is located in the soft parts, without any contact between the pus and bone, the calcium content is low; but that when the pus is in contact with bone for a long time the calcium content is high. The calcium content, therefore, tells whether the abscess from which the pus comes is in contact with exposed bone or not.

It would be a mistake to let the idea go out that a high calcium content always indicates immediate operation. That is not the case. It means that the bone in the mastoid is exposed; whether a case in which the bone in the mastoid is exposed should be immediately operated, or whether in a case in which there is a low calcium content and the bone is not exposed one should wait before operating, are matters which depend upon clinical observation of other clinical signs, and not on the chemical determination alone. Some otologists do not hesitate to claim that we should not wait until

the bone is exposed but that as soon as it is inflamed it should be opened; others go to the opposite extreme. The difference of opinion in many cases is considerable, and we must depend not only on our knowledge of the condition of the bone but on other clinical data in the case. The calcium determination, however, does give a definite point in the evolution of mastoid pathology by telling us what the condition of the bone is.

We can make a calcium content determination when the patient first comes under observation and decide whether at this time the bone is exposed within the mastoid cavity, or whether the abscess has not yet gone through the mucous membrane; or we can follow the case from day to day and watch the calcium content, and if we find it increasing we can arrive at the conclusion that the bone is becoming more and more exposed.

It is, however, not only in cases of mastoiditis that the calcium content of pus will be of importance. It will be of importance in every case in which suppuration takes place in the neighborhood of bone, and particularly in the accessory sinuses of the nose. There is, however, a difference between the nasal accessory sinuses and the mastoid cavity in this respect, for while it is not difficult to obtain pus from the middle ear, there is difficulty in obtaining uncontaminated pus from the nasal sinuses; for the pus discharge from the nose comes not only from the accessory cavity but from the nasal passages also, and its calcium content is not a fair indication of what is going on in the sinus. We must get the pus from the sinus itself. It is not ordinarily possible to introduce a needle into a sinus and aspirate pus from it. The only sinus in which this can be done is the antrum, and in order to get pus, the antrum has to be pretty full of pus. I have tried to blow the pus out of the antrum with compressed air, and in this way I have succeeded in getting pus from one case. In most cases we can only obtain it by irrigation, and when the pus is fluid and mixes with the irrigating water no determination can be made, for there is then no method of measuring the pus quantitatively. On the other hand, when the pus has a mucopurulent consistency, it remains as a mass in the irrigating fluid; if it remained so for any length of time it would lose its calcium content—but if removed immediately from the irrigating fluid, practical experience has shown that reliable results can be obtained from pus obtained in this way. It was in this way it was obtained in most of the cases in which the examinations were made. In one case of acute sinusitis, the calcium content was very high on the first examination. This was due to the fact, I believe, that in the beginning of the acute sinusitis there must have been an erosion of the mucous membrane of the interior of the sinus. Not long ago, Dr. Dean showed a number of pictures in children in which such erosions were clearly demonstrated; and everyone who has operated on acute accessory sinuses has seen blebs and blisters which were found to have bare bone underneath.

I can mention in addition one case of interest in which pus from the bronchi of a child with a piece of bone in the branchus was examined. The pus showed no more calcium than the ordinary lung abscess pus, but I believe this was due to the fact that the quantity of pus coughed past this little piece of bone was very large; most of the calcium had been cooked out of it; and no amount of pus was in contact with this piece of bone for any length of time. It takes some time to dissolve the calcium out of the bone. Nevertheless, it was extremely interesting to analyze this case.

I believe that this discovery of Dr. Friesner's will prove most valuable in the diagnosis of mastoid pathology, and that it will rank as one of the outstanding achievements of American otology.

DR. WHITING: I can express my views on the subject very briefly, as I had no suspicion of what was intended in the announcement of this program for the evening, and have had no experience whatever with the procedure. I can only say that I am flattered by the tribute paid in calling upon me, but as I know nothing about the subject would rather defer any discussion until I am better informed.

DR. JOHN MCCOY: I wish to be among the first to congratulate Dr. Friesner. I can see great value for the method in those subacute cases between acute and chronic, cases which would drift along for five or six weeks and in

which one would hesitate whether to operate or wait. Here we have a very excellent sign to guide us as to whether the mastoid inflammation is progressing or retrograding. At the same time, I should also like to congratulate the men responsible for being able to determine the calcium content in so small an amount of pus. That is a great achievement—to be able to determine that in a drop or a drop-and-a-half of pus. I assure Dr. Friesner that I will take every opportunity to try out this method; it will be particularly valuable in cases where there has been a long discharge. Some I have been able to cure with zinc ionization. It will be very interesting to discover whether this method will tell which ones can be cured in this way.

DR. ERNST DANZIGER: Did they ever make a comparative study of the calcium content of the blood and pus at the same time?

DR. FRIESNER: I wish to thank the gentlemen for their interest in this matter and for the discussion. I don't believe that I am unduly modest. The purpose of this presentation is to interest men like Dr. McCoy. We are scarcely justified in drawing positive conclusions from the small amount of experience we have had, even though there has been an exact parallelism between the chemical findings and our clinical findings. There must be more experience before a definite conclusion can be drawn. I believe the chemical test can aid the diagnosis. Where this excess of calcium comes from, if not from necrosing bone, I don't know, but I am not a chemist. I am quoting the chemists when I make that remark.

Now with regard to a comparison of blood, etc. That has been done; I thought at first that the problem might resolve itself into a differential determination between the calcium in the pus and that in the blood. In the literature we found that one publication contains a large series of examinations in which the claim is made that calcium is drawn from the skeleton and that there is in all suppuration an increase in calcium in the blood and the pus. However, our figures certainly show that this is not so. We made a few determinations of calcium in the blood; and I believe I quote Dr. Kuttner correctly in saying that he was sure it was useless for us to continue to compare the calcium in the blood with that in the pus, because the calcium in the blood is not often changed.

The Use of the Carrel-Dakin Solution in the Postoperative Treatment of Mastoid Wounds. Dr. Stuart L. Craig.

DISCUSSION.

DR. WHITING: When Dr. Craig first suggested this treatment in mastoid wounds I was skeptical of its efficacy, but after trying it my conversion was as sudden and conclusive as that of St. Paul, and for the past few years I have done no mastoid operation in any private case without employing the technique he has described so accurately. It seems strange that in all the years that have followed the initial development of the mastoid operation all our efforts have been directed toward the bone surgery of the procedure, and that so few attempts have been made to handle advantageously the tegumentary flaps. A few years ago, as the Doctor cited, the so-called blood clot procedure had quite a following for a time, and then it seemed to lack the necessary scientific basis and gradually fell into disrepute. I employed it a number of times at the infirmary and elsewhere and had some unsatisfactory results, and I saw a case in consultation where a colleague had used it, and not only was there a slough of the flaps, but complete destruction of the entire temporal muscle; and subsequently he had to undergo the annoyance of a lawsuit and paid a considerable sum to placate the patient who had been the subject of his experimental trial.

For a time other methods have been used with the intent of sterilizing the bone cavity. You remember we used dichloramin-T in solution; but it was very irritating to the skin and we did not develop the necessary technique to make the procedure a satisfactory one, so that it did not appeal to most of us.

I am fully convinced of the efficacy of this method which Dr. Craig has so carefully delineated, and believe that in the vast majority of instances it will be associated with healing so satisfactory as to leave little to be desired. I do not know in how many cases I have used it during the past six years, but the number is very considerable, and the results in the relation to curtailing

the duration of time and the comfort to the patient were truly most gratifying. I had one case especially with a very prominent woman in social life in this city with a severe bilateral mastoiditis, and she having had several previous mastoid operations in her family (I think I have done four or five on her children) was much concerned regarding the discomforts of the dressings subsequent to operation; and when I suggested using the Carrel-Dakin method she was quite willing, for I assured her she would suffer much less than had her children. Notwithstanding the great extent of these two procedures, for she had unusually large mastoids, one was solidly healed on the sixth day and the other on the ninth day; the latter would have healed as quickly as the first had I not been a little doubtful about the cultivation made from the secretion in the depth of the wound; furthermore, there was never any accumulation of serum, and we never had to open the wound subsequently; that is important. When the bony walls of the mastoid cavity are entirely covered with granulations you may begin taking cultures from the depth of the antrum, and if the organism does not grow it is not so much a matter of concern whether or not there are six or ten colonies to the microscopic field. The importance is largely determined by whether or not the organisms grow. If they do not grow, you can remove the tube, make pressure on the flaps, and permit healing.

Now, a word as to the possibility of the method in hospital treatment; as conducted at the present day, I don't think it particularly adapted to hospital treatment. You must have meticulous care in employing the method, as Dr. Craig has indicated, and you cannot get that in any hospital with which I have been connected, in the ward cases. The nursing problem is too acute; the nurse has too many cases to care for and cannot give the necessary attention to the details to secure a favorable outcome; but in private cases, where you have private nursing, I know of no method that has been devised which has so much to commend it as the application of the Carrel-Dakin; and if you wish to know the impression created by its use I would advise that you try it on a case which has once before been operated upon for a mastoid and which has experienced for weeks or months the discomfort of having gauze introduced through a long sinus to the bottom of the antrum before healing took place. If in the second operation you employ the Carrel-Dakin method you will have an opportunity to realize what it means to the patient. Any patient who has once endured the gauze method and after that experiences the Carrel-Dakin method will rise up and call you blessed.

Dr. McCoy: The method described by Dr. Craig is ideal under ideal circumstances; in other words, where the patient can have special day and night nurses, and also where one can get the proper solution of the Dakin sodium hypochlorite. Four or five years ago Dr. Craig asked me to try this method at the infirmary, and with the assistance of Dr. Whiting's thousand dollars we were able to get day and night special nurses. It was marvelous to see the effect. Cases that would ordinarily require six or eight weeks would heal in nine to fourteen days. However, that did not obtain in all cases. We found it made a difference as to who made up the Dakin solution. We got most of our solutions from Bellevue Hospital, and when we used this solution we got perfect results. Then we bought a tube of chlorine (I think the best method of making it is from chlorate of lime) and made it by forcing the chlorine into the sodium solution, and our results with that were not nearly so brilliant. In a number of cases the flap melted down and there was destruction of the flap and it had to be resutured. So, if we follow the directions outlined by Dr. Craig and have ideal conditions, with a day and night special nurse, you can instill this solution every two hours, and it will be found an ideal method. But it must be remembered that we must have a perfect Dakin solution and ideal conditions under which to use it.

Dr. Alfred Kahn: I believe that I was the first to use Dakin's solution in the dressing of mastoid wounds; and I feel sure that I was the first to publish a paper on the subject. This was the article referred to by Dr. Craig. It was suggested to my mind in the following manner. I had had great difficulty in healing a very large mastoid cavity, in a patient about 40 years of age, who was receiving antisyphilitic treatment. He had been operated twice and

his wound would not heal. Dakin's solution was just then beginning to be used and I tried it on this patient with prompt healing.

My technique is somewhat different from that of Dr. Craig's. I have always used two tubes; a small one at the upper end of the wound and a larger drainage tube at the lower end of the wound. In this way through and through drainage is maintained; and the wound can be irrigated through and through.

Some of my cases suffered from irritation and inflammation of the surrounding skin.

Two wounds (in children), after having made a quick closure, broke down about ten days later, necessitating reopening; and then I packed. This secondary breaking down of wounds in private practice is a disagreeable happening. For this reason I stopped using Dakin's in children; though in children I consider it most ideal. They make the best heal.

DR. GEORGE E. DAVIS: I heartily agree with the essayist in some of the beneficent claims he makes for the Carrel-Dakin treatment of the mastoid wound. Especially do I concur in what the opening discussant said in condemning the passe, painful, tardy method of *packing* the wound.

Unquestionably, every method has its advantages and disadvantages. The essayist stressed two advantages of the Carrel-Dakin technique; one, the short duration of healing; and the other, that if it failed you had not lost anything, but were just where you started. However, I was pleased to note the modest admission that the complex technique which he so graphically described is susceptible to improvement. But I am somewhat surprised at the statement in the opening discussion contrasting the Carrel-Dakin method with the blood-clot dressing, to the effect that the latter had fallen into disrepute, imputing as a reason hazardous complications. On the contrary, I believe the *modified* blood-clot method is being practiced more than ever before and is safe and efficient. The modification advocated and practiced by me for many years, which provides chemical sterilization of the wound before the clot is turned in and for temporary drainage, undoubtedly will prevent any serious complications. I am aware objection has been made to the blood-clot dressing when the dura or sinus is exposed; however, I have used this treatment in such cases without accident. In a unique case, an alcoholic and luetic, reported some time since, there was a subperiosteal abscess, a perisinus abscess, as well as a sinus thrombus. After thorough exenteration, turning out the sinus clot, disinfecting with 3 per cent iodin and alcohol, the wound was packed with iodoform gauze which remain for five days, when it was removed and a blood-clot turned in. At the end of twelve days from the blood-clot dressing the wound was healed and the ear dry, seventeen days from the original operation.

If you will disinfect the wound after exenteration and provide proper drainage for the serum to escape you will avoid all accidents and secure primary healing.

In conclusion, let us contrast the two methods. Simplicity is a great advantage to any technique and from this point of view everything is in favor of the blood-clot dressing. The complex technique of the Carrel-Dakin procedure requires all the facilities of a well organized hospital, constant expert nursing, perfect equipment, proper solutions, etc., because the slightest slip at any step in the technique means not only failure but may prove disastrous to the soft tissues, entailing much discomfort and suffering to the patient.

On the other hand, the blood-clot technique may be successfully and safely practiced anywhere by any first class aural surgeon in private or clinic, and with a minimum of hospital and nursing facilities.

Certainly, the healing period, the total avoidance of pain or discomfort and the ideal cosmetic results are all in favor of the blood-clot method when properly practiced.

Finally, my contention is: "Why have mastoid wounds? In a great majority of cases if you will close them up with a blood-clot, all you have to do is to make a few outside dressings; and, as a rule, many cases are healed in seven to fourteen days.

DR. DANZIGER: Dr. Craig uses the Dakin solution every two hours; I suppose you want it to stay in as long as possible. How does he control the position of the child, especially where there is a double mastoid?

SECTION ON LARYNGOLOGY AND RHINOLOGY.

Regular Meeting, March 23, 1927.

Recurrent Hemangioma of the Larynx. Dr. A. J. Huey and Dr. L. T. LeWald.

This young man was presented before this Section three years ago, at which time I had removed a large lymphangioma from his pharynx and larynx. The tumor was noticed when he was 6 years old and had developed to the size of a plum at the time of operation, when he was 23. It extended to within half an inch of the vocal cords and consisted of fibrous tissue with large lymph spaces. Some blood was in the lymph spaces, due to the traumatism of the operation, but the blood supply of the tumor was not great. The pathological diagnosis was lymphangioma.

The patient remained three years without recurrence. He was under observation about every three months. Last November he complained of some irritation in the throat. When I saw him in January, 1927, I found a growth involving the right side of the posterior wall of the pharynx. This increased rapidly to the size of a finger during the next few weeks. He was put under X-ray treatment, which checked the growth for a time, but it has continued to enlarge. The recurrent tumor is red and extremely vascular and appears to be a true hemangioma, rather than a lymphangioma. It sprang from the site of the old growth on the posterior wall of the pharynx and is adherent to the lateral wall on the right side. There is also a growth further to the left on the posterior wall of the same kind of tissue but only slightly raised from the mucous membrane. By direct laryngoscopy the lower end of the tumor can be seen one-half inch from the arytenoids.

Dr. LeWald has some radiographs taken at the time of the previous growth which helped to localize it, as at the time we were unable to see its full extent. He also has taken pictures at this time, utilizing a new method to bring out the outline of the tumor clearly. He will tell you about them himself.

How shall we treat the case? Some form of cauterization seems indicated. Removal by knife or scissors as was done with the previous growth is out of question because of the vascular character of the tumor. Some form of cauterization or coagulation must be considered, either with or without the aid of the diathermine knife. Suggestion for treatment will be appreciated.

Dr. LeWald: I wish to demonstrate radiographs of, first, a normal larynx and pharynx; and then show you a retropharyngeal abscess; and, finally, a new method of outlining tumors or other lesions in the larynx or pharynx. The new methods was devised by Dr. D. R. Jones and consists of a mixture containing lipiodol, which, when applied to the mucous membranes in question, or any protruding foreign material, such as a tumor or foreign body, will adhere to the same and give an outline on an X-ray film. Dr. Jones will tell you of the proportions of lipiodol and acacia and oil in the mixture. Dr. F. M. Law was the first to suggest the addition of oil to lipiodol and he will explain his reasons for so doing. In Dr. Huey's patient the outline of the tumor (hemangioma) can be made out extending from the second to the fifth cervical vertebra.

Dr. David H. Jones: In the Bronchoscopic Clinic at the Manhattan Eye, Ear and Throat Hospital we have endeavored to find a vehicle which would combine with the iodized oil and would adhere to the mucous membrane and enable us to make X-ray photographs of the larynx.

Dr. F. M. Law, Roentgenologist to Manhattan Eye, Ear and Throat Hospital, and myself found after considerable experimentation that mucilage acacia, using it in the proportion of half-an-half, would combine with the iodized oil and form an emulsion.

One hour before the examination, patient is given a hypodermic of morphin, grs. ⅙-¼, and fifteen minutes before the larynx is cocainized with 10 per cent cocain, using the drop method.

The emulsion is then carefully instilled into the larynx by allowing it to spread over the epiglottis as a grayish film, using 30 to 60 minims, instructing the patient to use every means to check the cough reflex. Stereograms in the

lateral position should be made as soon as possible after the introduction of the emulsion.

This method, which we have called laryngography, has enabled us to obtain very clear photographs of the epiglottis, cords, arytenoids, and also to outline both walls of the trachea below the cords.

While working with the iodized oil in patients with fistulous tract we injected it into an empyema patient with very striking results.

J. B., age 4 years, on whom a right mastoidectomy was performed on Dec. 15, 1926, and on the sixth day developed cough, dyspnea, high temperature and pulse, and rapid respiration, resulting in a left pleura-pneumonia; three thoracenteses were done, with removal of pus from cavity, and on Jan. 7 rib resection was performed. After this the child ran a septic temperature and was given three blood transfusions, but symptoms did not clear up and he was turned over to the Bronchoscopic Clinic for bronchoscopy. Before doing it, Dr. Law and myself, desiring to map out the empyema cavity, injected 30 c.c. of dilute iodized oil into the sinus, with striking results in an immediate drop of pulse, 150 to 100; respiration, 56 to 34; and temperature from 105° to 97.° This continued for ten days, when the empyema tube was removed and the patient developed an increase of pulse, respiration and temperature, which dropped as soon as the tube was reinserted and the iodized oil instilled in the cavity.

Whether the iodized oil has a marked antiseptic or antipyretic action I do not know, but as we have had the same results in clearing up other fistulous tracts I think it due to the antiseptic action of the iodized oil.

DR. LAW: All I can say is that the method is simple, and I think Dr. LeWald's presentation has given us an illustration of the efficacy of the method. The difficulty is to get the lipiodol in some solution which will adhere to a moist mucous surface. From the view we had, I don't think there is any question about being able to visualize any tumor in the larynx. The method is well worth investigation and development, but it will require much time and work; and much credit is due to Dr. Jones for the time and work he has spent on it.

DISCUSSION.

DR. FORBES: Is the growth localized to the right side? I gather that ligature of the external carotid will be indicated if growth is limited to that side.

DR. HUEY: We have considered a ligature of the external carotid but probably it will not be necessary. Most of the attachment is to the posterior wall, though the tumor is adherent on the right side of the pharynx. It is probable that we will coagulate the tumor and allow the mass to slough.

DR. WELCH: What about the use of radium in such a case?

DR. HUEY: Radium was suggested when we operated three years ago; in fact, he had one treatment with radium immediately after the removal of the first tumor, after it healed. It was not practicable at the time to arrange for further treatment, as the boy was anxious to get back to work, so the radium treatment was abandoned and a watch was kept on the patient. I feel that radium treatment of the tumor to prevent recurrence will be indicated now very strongly, but I do not think it would be indicated as treatment. The X-ray examination shows that the tumor is growing very rapidly and we feel that something more radical should be done.

Removal of Foreign Body from the Bronchus. Dr. Joseph Coleman.

This report concerns a child, age 12 years, who was brought by her mother to the Nose and Throat Clinic of the Bellevue Medical College, with the following history. On the previous day, the child had a brand new paper clip, of the type with a head and two limbs which are pierced through the paper and then bent out; the child put one of these clips in her mouth, and chewed it pretty much out of shape, and after a spasm of cough, the paper clip disappeared. She was given an emetic and a cathartic, and the vomitus and stools examined, but no paper clip was to be found. The child began to have frequent attacks of severe spasmodic cough, which lasted several hours, then quieted down, so that she had a fairly comfortable night. She was not coughing much the day that she was brought to the clinic.

Examination of the upper respiratory tract was negative. She was immediately fluoroscoped, and a foreign body was visualized on the right side near

the midline. Barium in milk was given the child to drink, the outline of the esophagus was visualized, and it was seen that the foreign body was not in the esophagus. She was then X-rayed and the plates showed the paper clip in the right bronchus, at the level of the eighth interspace. General anesthesia was administered, and a 7 m.m. bronchoscope introduced. The foreign body was readily found, but when within the jaws of the grasping forceps, it was found to be too large to pull up through the bronchoscope, so that the foreign body, forceps and tube were all withdrawn together. The child left the ward and went home the following day.

The lantern slide shows the reduced X-ray plates, one taken anteroposteriorly, the other laterally, and shows the paper clip in the bronchus. There are several markers on the anterior chest wall. The slide also shows the paper clip after removal, taken from two different angles.

Recurrent Facial Erysipelas. Dr. Francis White.

This patient came into the clinic within the last couple of days and I brought him here for presentation previous to undergoing treatment. For the last five years he has suffered from repeated attacks of facial erysipelas, the attacks occurring every six to eight weeks. In the recent attacks, the swelling of the face has not completely subsided. A streptococcus of the erysipelas group has been found in great numbers in the discharge from the nose during the attacks. The X-ray shows an involvement of the ethmoids and antra on both sides. Wassermann and Kahn reactions are negative. The patient is to undergo immunization, and operative procedure on the sinuses, after which I hope to be able to report favorably.

E. H., age 27 years. At 13 years of age, adenoids and tonsils removed. A year later had first attack of erysipelas. After the third attack the lower eyelids and neighboring portions of cheeks remained swollen. Had three attacks a year for about seven years and from that time on had two attacks a year—spring and fall. There had always been more or less discharge from the nose and for this reason the ethmoids had been removed. I saw the patient during the last attack, upon the termination of which she was referred to the Manhattan Eye, Ear and Throat Hospital, Dr. McCullough's Clinic. The examination at this time showed nothing very special except a moderate amount of discharge in both nasal fossae. The skin of the face, however, did not seem to be of different texture than when seen with the acute inflammation, except the loss of distinct color and heat. Upon palpation, the entire thickness of the cheek seemed involved, and if taken up between the fingers and thumb, had more the feeling of leather than human flesh. The eyelids—both upper and lower—were involved to the same extent as when I first saw her; that is, the eyes to a great degree were closed.

Skin tests for foods, etc., were negative.

Hemoglb., 75 per cent; R. C., 4,000,000+; W. C., 7,000+; Polys., 65; S. L., 26; L. L., 9.

Patient was given a series of cacadylate of soda injections, 1 c.c. every third day (twelve doses). This was followed by ov. ext. gr. 5 thyroid ex. gr. 1/10 Tid.

X-ray report stated that all sinuses except the sphenoids showed moderate or severe involvement, especially the antra. Irrigation of the antra was carried out regularly, but there was no apparent improvement in the condition under conservative treatment and it was decided to do radical antrum operations. This was done in the middle of October, 1925. A Caldwell-Luc operation was performed upon each antrum one week apart. After the natural reaction had subsided there was a slow but progressive improvement in the patient's facial condition and she has not had an attack of erysipelas since.

DISCUSSION.

Dr. McCoy: Several years ago I saw a case of recurrent erysipelas, and it was accepted as a recognized fact that butchers are subject to recurrent erysipelas.

Dr. Bruder: I happen to have treated a physician whom most of you have known, who had recurrent attacks of erysipelas. He was a physician, not a butcher, and had these attacks annually also, around spring time. I treated him for two or three years and when I saw him last he had had about his

eighth attack; after that I think Yankauer operated on his antrum, but in spite of that he had two or three more attacks. He has since passed away, but he had altogether about eleven of these attacks.

DR. H. M. SCHEER: It is interesting to hear that in each of these cases the sinuses were apparently involved. It seems probable that the sinuses are really behind the erysipelas. I can add another case of a patient who had annual attacks of erysipelas for four winters—every time at about the fall season, and this case, too, had been operated on. The original attack followed a septum operation, and for four winters following this, at about the same time of the year, the attacks occurred. During the fifth winter she came to New York for treatment of the nose in an attempt to avoid the erysipelas. It was found that she had pus in the nose, with a polypoid condition of the ethmoids. This was treated, and for the past two winters she has had no recurrence. We should look into the nose for sinus conditions in these cases.

DR. HUBERT: I have had the pleasure of observing Dr. White's patient. I believe that the condition presented by this patient is something more than ordinary recurrent erysipelas. Usually after an attack of erysipelas the patient's face resumes its normal appearance. In Dr. White's patient there remained a swelling and hard edema of the face for many months after the attacks of erysipelas. Such cases have been described in the literature as solid edema of the face. This solid edema is not a disease per se, but a rare complication of recurrent erysipelas. But why should the edema persist and what is its nature?

While washing out one of the maxillary antra of the above patient I noticed that her face became swollen and edematous similar to the condition following an attack of erysipelas. There must have been a dehiscence in the antral wall. It is possible that the toxins produced in the diseased antra enter the subcutaneous tissue by means of the lymphatics or through dehiscences in the wall of the sinus, and cause irritation, with resulting hyperplasia of this subcutaneous tissue. This may be only a theory, but the fact remains that these patients present a hyperplasia of the subcutaneous tissue of the cheeks, eyelids and lips. Most of these patients have some form of nasal sinusitis and have been relieved by autogenous vaccines. Dr. White's patient got well after radical operation on the antra.

DR. J. D. WHITHAM: After the diagnosis, of course, the treatment is the most important thing to consider, and I would like to say a few words about the treatment of erysipelas by active immunization. Recently the University of Rochester reported twenty-four cases of recurrent erysipelas, treated by active immunization of the streptococcus of erysipelas, and in none of these cases was there any subsequent recurrence. The method consists of repeated injections of a filtrate of streptococcus erysipelas. The streptococcus is obtained in the same way and has the same characteristics as the streptococcus of scarlet fever; cases of erysipelas, as scarlet fever, can be immunized in the same way. An active immunization can be produced in a few days, and the antitoxin is found to be present in large quantities in the patient's blood. Such treatment should be given in these cases of recurrent erysipelas before proceeding with any operative work, unless there is definite knowledge of pus in the sinuses.

DR. WHITE: In 1896, C. Janson, a Swedish author, was the first to recognize the etiological relationship between facial erysipelas and nasal accessory sinusitis. He wrote a paper entitled, "Causes of Infection in Facial Erysipelas." Having presented no cases to confirm his opinion, the paper received but scant attention. Rhinitis or pharyngitis, conditions frequently overlooked but not infrequently present, may usher in the disease. Streptococci may assume the role of saprohyte under certain conditions in the throat, but if transferred to lymphatic spaces suddenly assume great virulence. This probably obtains in the form of streptococcus hemolytics, causing erysipelas. Minute fissures or excoriations about the entrances to the external auditory canals or nasal chambers, may be the starting point of a facial erysipelas, but it does not necessarily arise exactly at the point of inoculation, but may occur some distance from it. The so-called recurrent or idiopathic form of erysipelas is associated with cold, damp weather, particularly in the spring and autumn, with probably about one-half the number of cases occurring between February and May.

About 90 per cent of the cases of erysipelas are of the facial type. The disease is inocuable and much less contagious. It involves the skin and subcutaneous tissues. The incubation period is from three to ten days. Facial erysipelas may be followed by a more or less solid edema, especially of the eyelids, but the face and lips may be involved.

Referring to Dr. McCoy's statement about butchers having the condition, I can understand that, for erysipelas is mostly a disease found in cold and damp weather, and most of the butchers are in and out of their refrigerators much of the time, and one can see how that might be an etiological factor or could the condition be a lymphangitis?

The case mentioned by Dr. Scheer is quite similar to this one.

As to what Dr. Hubert said, I saw the patient after the treatment, but it was a localized condition. Both sides of the face were involved exactly alike.

In regard to the use of antitoxin, it is in use at the Manhattan Eye, Ear and Throat Hospital and I am told we are getting very good results. We did not have it when I operated on this patient.

We considered solid edema, which is practically myxedema, and is a glandular condition; and that is one of the reasons why Dr. Hubert, who is so well versed in that line, put her on glandular therapy. It may be congenital.

We also considered lymphangitis. This occurs in the acute exanthemata and infected wounds. Most frequently it occurs on the hands and feet. In severe "colds" it may occur about the lips and nostrils.

Forms: simple, purulent and proliferative.

In the simple form, the wall of the lymph vessel is involved, as is also the surrounding tissue, giving rise to a condition of hyperemia and edema. Hemorrhages may even occur. The condition either returns to normal or becomes chronic. Both purulent and proliferative forms were eliminated in this instance.

Filariasis was easily rule out. But after due consideration we decided upon erysipelas and the result of treatment has been decidedly satisfactory, the texture and feeling of the skin of the face appearing as if nothing of an inflammatory nature had ever existed.

Cerebrospinal Rhinorrhea. Dr. Francis White.

The patient, a woman, age 50 years, was presented, showing the fluid dripping from the nose. This discharge started about seventeen months ago, preceded by hemorrhages from the nose for a few days following a fall from which patient sustained a fracture of one of her arms. The flow of fluid from the nose continued for about eleven weeks and then ceased until nine months ago, since which time it has continuously discharged, with slight variations in amount. When there is a slowing up of the flow the patient suffers from headache, which passes away when the flow is again increased in amount. As much as one-half pint of the fluid has been obtained in one-half hour. A specimen of the fluid was taken direct from the clinic to the laboratory, where the diagnosis of cerebrospinal rhinorrhea was confirmed. Dr. White stated that he fully realized the futility of treatment and was presented the case for the double purpose of interest and the fact that some patients, not infrequently, become wanderers; that is, going from clinic to clinic in the hope of obtaining relief.

Question: Was there any operative interference? Dr. White: No.

Question: Was there any ocular disturbance? Dr. White: No.

Question: Was she unconscious after falling? Dr. White: No.

Was she badly injured? Answer: Just the broken arm and nose bleed for an hour.

Did she have much headache? Answer: Some. When the flow stops or is slowed up, she has headaches; as soon as it starts, the headache is relieved.

Dr. McCoy: Those of use who have practiced rhinology long will realize that this is one of the rhinological hysteries. I have seen three cases of this type, and they usually come in without a history of trauma. There seems to be nothing to account for this flow; they usually give a history of having had severe attacks of rhinorrhea for six or eight weeks, and then it stops for no apparent reason. I think that eventually these patients die of meningitis.

As far as treatment is concerned, it is much better to let them alone. There is practically nothing we can do. It is difficult to find where the dehiscence of the internal plate is, and if we attempt interference we may get infection of

the meninges. It is really a rhinological mystery, and I think Dr. White had better let her alone than to fuss around in the nose very much.

DR. HUBERT: Six years ago I saw a patient with cerebrospinal rhinorrhea, with no history of fall or injury. One thing should be kept in mind. When you get the fluid, it must be examined within half an hour or you may get no reaction of sugar—due to its rapid fermentation. From the symptoms presented by my patient, I was certain that it was a case of cerebrospinal rhinorrhea, yet the laboratory found no sugar in the nasal fluid. This was due to delay in the examination. Another specimen was examined within half an hour after collection, and showed the presence of sugar.

DR. ROBERT HOWARD: Five years ago I had a similar case with no history of fall or injury, but with a strong neurotic element; we treated the patient on that basis, but she had recurrences.

DR. WELCH: Some fifteen years ago I did an autopsy on a woman, who had been a masseuse but had had to give up her work on account of this trouble; it would stop at intervals, but when it stopped she would have headache; finally she caught cold, and came to the hospital, and had a meningitis, and at the autopsy there was a curette opening between the membrane and the cavity. She had been seen by numerous rhinologists, but no one had found this condition. I would give the same advice as Dr. McCoy, not to attempt too much manipulation.

A New Operation for Epistaxis. Dr. George E. Davis.

Epistaxis is due to local and constitutional causes for the most part local.

The seat of bleeding in 90 per cent of these cases is situated on the anterior part of the septum, about 2 c.m. above the nasal floor, and known as Kiesselbach's area. The origin of the hemorrhage is from a plexus of vessels formed by the anastomis of branches, posteriorly from the sphenopalatine—or "artery of epistaxis"—above from the ethmoidal, and below and anteriorly from the palatine.

Occasionally the point of bleeding is higher up and further back on the septum and the source of the hemorrhage is from the ethmoidal veins or telangiectases of other vessels. Usually in these cases the bleeding is profuse and intractable.

Ordinarily cases of nose bleed are easily controlled. Rest, pressure, cold compresses externally, compresses of adrenalin at point of bleeding, 10 per cent solution silver nitrate on cotton-wound applicator, or the galvanocautery generally afford prompt relief. But, it is a different story when we encounter a desperate case, patient bled pallid, restless, respiration shallow and pulse thready. To control the hemorrhage and relieve this patient taxes our every resource.

Several operations have been proposed to check epistaxis and heal the local condition causing it. Lashure has reported a number of cases in which he was successful in checking the hemorrhage by elevating the mucous membrane as in the submucous septum operation. Hunter Mackenzie, where the bleeding is profuse and from an extensive area, ablates part of the mucous membrane.

However, as all remedies and procedures failed me in a case of extreme epistaxis, in the person of a husky blacksmith, who suffered from recurrent attacks at varying intervals, in which the profuse bleeding seemed to continue until he was all but exsanguinated, or the heart became too weak to force the flow, the simple operation outlined below brought prompt and permanent relief and cure.

It occurred to me if I could locate and isolate the bleeding area I would be master of the situation.

After cleaning the nares of clots and shrinking the tissues with cotton compresses soaked in adrenalin and cocain, I observed the blood welling from a point high up and rather far back on the septum coming from a dilated, broken ethmoidal vein. Under bright illumination, with a small right-angled septum knife I made a vertical incision through the mucous membrane, one-half inch, posterior to the bleeding area, another vertical incision about the same distance anterior to the bleeding area, and with a straight blade made similar incisions above and below the bleeding area—being careful to make

the upper and lower incisions nick or join the vertical cuts. These incisions must be far enough from the pathological or bleeding point or area to be made in normal tissues and extend not only through the mucous membrane but the perichondrium or periosteum as well. Bleeding from cuts in healthy mucous membrane is readily controlled—and, of course, with the supply cut across in every direction the bleeding area is isolated and the flow ceases immediately. The operative procedure is completed by cleansing the nares of clots, applying a 2 to 4 per cent silver nitrate solution on cotton-wound applicator to the original bleeding area and the fresh cuts as well. Packing the nose is not required—a pledget of cotton in the anterior nares, to be changed when soiled, is sufficient. Further local after-treatment consists in gentle cleansing and mild silver applications till healing is complete. Of course any constitutional contributory causes should be corrected.

The epistaxis is permanently relieved, since the future blood supply to the original area must come from small vessels entering through the *scar* tissue of the four isolating incisions in the mucous membrane.

The above operative procedure has never failed in other cases equally as severe as the one reported above.

DR. MCCOY: I wish to congratulate Dr. Davis on the method he described. I think he mentioned Dr. Leshure's method in prefacing his paper. I understand that Dr. Leshure did a small submucous operation, the idea being that there was a vessel in the membrane that had no chance to retract, and he reported success, lifting the membrane, etc., leaving soft tissue into which the bleeding vessel could retract. I have never heard of Dr. Davis' method before, but should imagine that after cutting off the blood supply from the tissue there would be a certain amount of death of the island of tissue left.

DR. WHITE: The impression I received was that if the blood supply was actually cut off, localized death would supervene. Personally, I have had few cases of hemorrhage requiring drastic measures, but elevating the mucous membrane and removing a portion of the septum has given excellent results.

DR. MCCOY: I have seen one or two cases where I felt justified in tying off the external carotid artery. The patient had been packed and repacked, but still kept bleeding for six days, and was bled white. There was a posterior deviation of the septum, and the bleeding was coming from an area just back of the deviation. The man was weakened from loss of blood and it was up to me to do a submucous resection or else tie off the external carotid artery; that seemed to be the best method. In about twelve to fourteen minutes under local anesthesia I made a practically bloodless operation and tied off the carotid. These patients can reach a stage where they get into a serious condition, and we have to do something to prevent further loss of blood.

DR. DAVIS: I was interested to hear Dr. McCoy's report of the case, where he deemed it necessary to do a ligation of the external carotid. How much simpler and easier the technique I have just detailed, and certainly applicable in his case, had he preceded it with a partial submucous septum resection.

The first case cited in my paper had been subject to profuse nose bleed, off and on, for a number of years and had consulted numerous surgeons but failed to get permanent relief. When he came under my care I tried all the usual methods, including packing, also the Leshure submucous septum resection technique, but only temporary relief was afforded by any of them. Finally I devised and performed the simple operation presented to you this evening which afforded immediate and permanent relief, now more than five years.

The method I suggest here has never failed me. Recently I saw a case in consultation in the country which had been bleeding for three or four days. The man had had his nose packed, but he continued to bleed, had lost a great deal of blood, was very pale, and the fear of death was written on his face. He could not eat or take nourishment, for as much of the blood passed into his stomach he suffered constant nausea and vomited on taking food, or even water. He looked as though he was going to pass out, but it was a very simple matter to take out the packing and temporarily control the hemorrhage with cocain and adrenalin compresses, then to make the four incisions about the bleeding area, which completely and permanently checked all hemorrhage. Presto, this man's whole appearance and countenance was transformed and

hope lighted his face. Surely this is safer, saner and more comfortable than packing or the submucous resection advocated by Dr. Leshure, and certainly less formidable than ligation of the carotids.

The question as to the effect on the vitality of the tissues segregated by the four incisions of this operation is pertinent and I am glad it has been raised. You must remember that the nasal mucous membrane is very vascular and where cuts are made through normal areas, restricted circulation, sufficient to maintain the vitality of the isolated area, is re-established in a few hours, but on healing the scar tissue barriers prevent forcible circulation ever after, effectually preventing recurrent hemorrhage in the pathological area on the original seat of the epistaxis.

My experience has been absolutely free from any difficulty along the line of isolating any tissue. It certainly is a quick, clean, comfortable operation, obviates all the various torturing packing processes and the necessity of radical surgery, as submucous resections and ligation of the carotids.

DR. MCCOY: I do not wish the impression to get abroad that I think it necessary to tie the carotid for every nose bleed. Dr. Davis said he could see the bleeding point. In the case I spoke of, you could not see the bleeding point, and it would have been necessary to do a submucous operation.

Physical Therapy as An Aid to Surgical Procedures in the Nose and Throat. Dr. John McCoy.

(To appear in a subsequent issue of THE LARYNGOSCOPE.*)*

DISCUSSION.

DR. CHARLES R. BROOKE: Dr. McCoy has given us a very interesting, short and snappy paper this evening on his experience with physical measures in nose and throat affections. The physiotherapy work in the Veterans' Bureau of this city operates and functions along with all the other clinical activities. The cases are referred from the various departments, surgical, nose and throat, orthopedic, etc. However, my remarks will be limited to the application of the various physical measures for relief of nose and throat conditions.

In 1924, I reported in the International Clinics, the technique of treatment of 200 cases of different affections of the nose and throat. These cases were referred by the nose and throat specialists, and individual findings recorded in the physiotherapy department, and the results were checked by the chief of the department and by the nose and throat specialist from time to time.

Dr. McCoy has mentioned the methods used, but I believe he omitted one very important modality, radiant light and heat, or radiant energy obtained from the different types and sizes of radio vitant applicators, carrying different wattage bulbs. This form of treatment directed over the face for twenty or thirty minutes in acute sinusitis will give very beneficial results. The action is as follows: relaxes spasm, relieves pain, causes an active hyperemia, opens up the fullness in the head and within the nose, thereby producing drainage, which always gives the patient prompt and adequate relief.

In the subacute and chronic types of nasal accessory sinus disease, we apply medical diathermy, which application produces a deep heat within the tissues, the effect of which is an increase of arterial blood supply, increased drainage through the sinus openings, definite analgesic action, improved local nutrition and metabolism, thus a decided favorable influence on the disease process.

This form of heat production can be localized to the affected sinus by the direct sedative or modified sedative method, the former by placing metal electrodes, the active electrode over the affected sinus area, the other electrode opposite, connection being made to the D'Arsonval binding posts of a good high frequency machine. The latter method is given in the following way: the active electrode is a non vacuum electrode, which is moved over the different parts of the face, concentrating over the particular sinus affected, the inactive electrode is a triangular piece of metal placed about the nape of the neck, the connection to the machine is made in the usual manner.

One has to use discretion as to the type of case to determine the best method to employ. These treatments are given on the average for thirty minutes' duration. These applications are immediately followed by the intranasal high frequency application, which is given with a non vacuum insulated electrode

and is attached to the Oudin terminal of a high frequency machine. At first the electrode is inserted as far back into the nose as possible and allowed to remain for five minutes, which is increased one minute until a maximum of ten minutes is given to each nasal cavity. This application thoroughly heats and vascularizes the nasal mucous membranes, promoting drainage through the sinus openings. This procedure is followed by the intranasal application of the ultra violet ray, to which Dr. McCoy has called attention, utilizing a quartz rod especially made, which is attached to a water-cooled lamp. The applicator is inserted within the nose as far as possible, at first usually for one-minute duration; during this time the rod is slowly withdrawn to permit radiation of the entire cavity, because most of the rays are emitted at the tip. The duration of treatment is increased one-half minute each subsequent treatment until a maximum of eight or ten minutes' application is made to each nasal fossa. The combination of the above modalities in sequence are always recommended to achieve the best results.

Since Dr. McCoy has referred to the use of the ultra violet ray in Vincent's angina, I will read the report of a case reported before the American Academy of Physiotherapy in May, 1925, and printed in the *Medical Journal and Record*, December, 1925.

Case J. R. Vincent's angina of the gums. History of resistent infection which failed to yield to the usual antiseptic applications. On admission, laboratory report showed many organisms. Technic of treatment: Ultra violet ray using solid quartz applicators under compression, beginning at one and a half minutes' duration, increasing a half minute each subsequent treatment, reaching a maximum of six minutes' duration. A total of eighteen treatments were given on alternate days. A laboratory test was taken prior to each ultra violet ray application, the presence of organisms gradually diminished, and after receiving three consecutive negative reports the patient was discharged.

We have had several other cases that responded very well, but our results have not been 100 per cent in the ultra violet ray treatment of Vincent's angina. I believe that much depends on the co-operation of the patient, and careful technique of the ultra violet radiation, together with careful and routine laboratory check up before and after radiation.

Again referring to the use of the ultra violet ray in nose and throat conditions, we know that the rays emitted from the water-cooled lamp are chiefly bactericidal and from the air-cooled lamp are dominantly biologic. And in this connection I wish to emphasize the importance of systemic radiation in conjunction with the local and focal radiation of the ultra violet ray to increase systemic resistance in the so-called "run down" patient. We know that the action of the ultra violet rays on the system increases the calcium and phosphorous content of the blood chemistry and thus increases the patient's resistance to any localized infection, particularly so in nose, throat and ear diseases.

The use of radium in cancerous and precancerous growths in the throat is beneficial, and there has been many reports of satisfactory results obtained. During recent years, surgical diathermy in the forms of electro-desiccation, electro-coagulation and the endotherm knife of "Wyeth," has been successfully used in the destruction of cancerous growths when accessible. We should differentiate the terms, electro-desiccation, which means simply the drying of the tissues, from electro-coagulation, which means the complete coagulation of a mass or growth, and, lastly, the endotherm knife, which completely separates the mass from the surrounding tissues, making possible the complete removal of a growth.

The term radio knife has been referred to by the essayist; this designation is not advised, because of its association with the commercial radio field of activities. I really prefer the term, acustector, coined by Dr. Howard Kelly, and meaning, "I cut with a sector."

In using medical diathermy, it must be remembered that the smaller electrode is the active one and is where the maximum heat is concentrated, therefore the localization of heat can be gauged in accordance with the size and shape of the electrode material. (Diagram and demonstration.)

The use of surgical diathermy in the treatment of diseased tonsils should be mentioned. It can be employed in the form of electro-desiccation where the tonsils can be shrunken and infected crypts destroyed, or by the electro-

coagulated method where the entire tonsil mass is coagulated and allowed to slough.

It is important at this time to mention the effect of the ultra violet rays on incipient peritonsillar abscesses. I have resorted to this application in several instances when the condition is seen before the actual formation of pus; this condition can be aborted by an intensive exposure of the ultra violet ray to the peritonsillar region, using a pharyngeal or laryngeal quartz applicator on a water-cooled lamp for two minutes' duration, directed as close to the affected area as is practical. In conjunction with this application a local exposure of ultra violet ray is made to the tonsil gland area about the angle of the jaw, using a flat piece of quartz about 1 inch square on a water-cooled lamp under a compression for about two minutes' duration, aiming to obtain a third degree erythema reaction to produce a stimulating and absorbing effect upon the enlarged glands.

I think the number of operations on the nasal accessory sinuses could be lessened a good deal by applying the various physical measures which have been brought to your attention this evening. We should not keep these measures in the back ground which have proved effective; they should be placed on an equal status with the medical and the surgical procedures for relief of otolaryngological conditions.

I don't wish to leave the impression that we don't advise surgical operations on the nose and throat. We certainly do, but we believe equally in the more conservative physical measures.

My impression is that there has been a tendency on the part of the profession in the past, and possibly with some at the present time, not to utilize the physical modalities at their disposal.

The physiotherapy service at the Veterans' Bureau is very active at the present time and we are getting results in our work, otherwise the specialists would not refer and recommend their patients for physiotherapy treatment.

DR. A. B. HIRSH: To those who have for many years been trying to induce the profession to add these physical measures to our other resources the paper of Dr. McCoy is certainly most gratifying. One or two points are suggested by what he has said, among these being why "physiotherapy," as the original designation, has recently been changed by some persons to "physical therapy." In Europe, where these methods have been employed for many years, a number of International Congresses of Physiotherapy have been held —the third in Berlin before the war and the sixth, since then, in Brussels; there was also the International Congress of Radiology and Electrology held in London in the summer of 1925, at which several American delegates were present. The term "physiotherapy" was adopted from European sources by army authorities in Washington when we entered the war and it became necessary to add a department of this kind to the others in our war hospitals. In those stations where I had the pleasure of serving—Walter Reed among others—this physiotherapy was conducted on an extensive scale, so that ample clinical ground exists for the statement that we cannot too soon add these physical measures in your own, as in all fields of practice.

At the Walter Reed, we averaged between 8,000 and 9,000 physiotherapy treatments a week, while at the Fox Hills Army Hospital, Staten Island, at one time we had 106 non-medical trained attendants in our department, and for a while were giving 2,300 treatments a day. That gives some evidence of the favor that these relatively new methods met in the large medical staffs of these institutions. They are now an established part of the treatment at Walter Reed Hospital, where a school of instruction of non-medical physiotherapy technicians has been established. Those who are interested, however, will find the largest physiotherapy department in the country at the U. S. Naval Hospital in Brooklyn, treatments being given throughout all week-day mornings.

Now, as to the point raised by the essayist on progress made in this field in the interim between the era of galvanism and faradism and the introduction of high frequency currents: When the late Dr. William J. Morton, of New York, came back from his post-graduate studies at Charcot's Service in Paris, in the early eighties, he brought home the valuable germ which he later developed to an exceedingly useful purpose, improvements of static electricity in treatment of disease and injury. Late in the eighties he published his discoveries

of the static wave current and the static induced current so that these acquired a wide vogue but later, because of doctors' lack of training in their technique, they dropped into disfavor. Now, with more intelligent understanding, they have come back and are being used extensively by those familiar with their correct technique. It was Morton's discovery of these static currents that probably led Tesla and d'Arsonval to study those of high frequency.

As for application of the static wave in nose and throat patients: It is especially useful in the extremely painful cases of acute sinusitis, an intranasal glass vacuum electrode carrying the wave current, an exceedingly small spark gap and slowly running machine being employed. You will find that in a very short time the patient has marked relief; congestion is removed and drainage returns.

I might refer to one more method that was introduced a dozen years ago, based on the information given by Dr. Albert Brubaker, Professor of Physiology in the Jefferson Medical College, Philadelphia. He spoke at a meeting of the American Association of Otologists, Rhinologists and Laryngologists at White Sulphur Springs, and showed the anatomical track through the sympathetic nervous system from the spinal cord between the seventh cervical and the first dorsal vertebrae to the vasomotor supply of the upper respiratory area. Applying this knowledge, you will recall how a draught of cold air, striking the nape of the neck, will congest and close the nares. Reversing that action, the vibratode of the electric vibrator is applied to the intervertebral space just mentioned (seventh cervical and first dorsal) for from three to five minutes, in cases of acute sinusitis. The result is usually effective, so much so that our non-medical technicians at the Walter Reed and other hospitals were systematically trained in the simple technique required.

The apparatus does not occupy much space in the office, and I would encourage members of the Section to its employment in both clinic and office. It is a dependable addition to our facilities for a variety of disease conditions.

DR. HUBERT: In Dr. McCullagh's Clinic we are using the ultra violet rays of the water-cooled quartz lamp, the alpine sun and the ultra sun lamp.

With regard to the effect of ultra violet rays on bacteria, Dr. Eggston, Pathologist of the hospital, made some tests on different cultures of bacteria. There was no bactericidal action. I have found the ultra violet rays very beneficial on enlarged glands of the neck. It is not necessary to operate any more for the removal of glands of the neck. If pus is present, the thing to do is to make a small incision, let the pus out, and then apply the ultra violet rays. Healing will take place with practically no scar. If there is no suppuration present, a few applications of the rays will literally dissolve the glands. These rays are also useful in acute sinusitis, but in chronic sinusitis I have noticed no benefit. We had a beneficial effect on a case of tuberculosis of the tonsil. Two cases of tuberculosis of the larynx showed no improvement.

DR. WYETH: In the surgical use of the high frequency current there is a definite standardized technique, so I was especially interested in what Dr. McCoy said about technique. However, he made several mistakes in terminology. I have tried to separate the medical from the surgical use of these currents by suggesting the word endothermy for their surgical application. The term diathermy for the *medical* use came out when Nagelschmidt presented his work to the Buda Pesth Congress in 1907. After this people spoke of medical and surgical diathermy. But surgical diathermy is only one of the three forms. In the surgical work we have the lighter current, the heavier current (surgical diathermy) and the cutting current. Each has its distinct indication, as exemplified in Dr. Huey's case of hemangioma of the throat. If he had used the lighter current, he would have had trouble, because it was not sufficiently penetrating; if he had used the cutting current, he would have gotten into serious trouble with hemorrhages; there coagulation was particularly indicated because he would have had a distinct shrinkage without loss of blood. There is a definite specific indication for each of the different kinds of current used, and one must learn this, as well as their proper application if the work is to be successfully done. I was not the originator of the cutting current referred to by Dr. White, and do not claim that for a minute. I did help perfect the endotherm knife; and had a great deal to do with first successfully applying the radio-frequency tubes and thus perfecting a cutting current and making it practicable as a surgical procedure.

IN MEMORIAM.

Death has claimed one of our most useful and nationally known senior colleagues in Otolaryngology. Dr. Hanau W. Loeb, of St. Louis, died suddenly of heart disease, July 6, 1927. Since December of last year he had been invalided but continued many of his activities to the last day of his life.

Born in Philadelphia, in 1866, Dr. Loeb attended the University of Missouri after his early education in the East, took the Degree of

A.B., in 1883, and A.M. in 1886 and returned to the East to study medicine in the College of Physicians and Surgeons, in New York City, graduating there in 1888.

After practicing medicine at St. Joseph, Mo., for several years he removed to St. Louis, in 1890, participating in the organization of the Marion-Sims Medical College and continuing with this school until its consolidation with Beaumont Hospital Medical College, and served as Secretary of the Faculty of the combined medical schools until they were absorbed as the Medical Department of St. Louis

University. In 1913, he was made Dean of the School of Medicine of St. Louis University and served faithfully and efficiently in this capacity until his death.

With America's entrance into the World War, in 1917, he was appointed a Major in the Medical Reserve Corps, serving with credit and distinction in the Department of Otolaryngology; wrote a handbook, "Military Surgery of the Ear, Nose and Throat", and participated in the direction of Otolaryngologic literature and statistics of that period.

When the new Jewish Hospital, in St. Louis, was projected, it was his genius for detail and organization that was largely responsible for the medical management and scientific equipment of this splendid institution. With the reorganization of the Medical Staff he was named Chief-of-Staff of this hospital, in which capacity he served until his death.

The organization of the American Board of Otolaryngology found another outlet for his special talents and he was named Secretary of this valuable body.

His principal contribution to American Otolaryngology was his long and valuable service as Editor of The Annals of Otology, Rhinology and Laryngology; his best individual contribution to our special literature was his excellent two-volume treatise, "Operative Surgery of the Ear, Nose and Throat", edited and published in collaboration with a group of especially selected colleagues; his best known research was on the Nasal Sinuses and the Determination of Their Capacity, Area, Position and Relations.

Dr. Loeb was active publicly in his fight against quackery and was a leader in all activities toward raising the standard of medical education and medical practice. His uncanny and unequalled capacity for work, his remarkable executive and organization ability, his fearless expression of his opinions and his loyalty to his friends were outstanding factors in his character.

In 1905, Dr. Loeb was President of the American Academy of Ophthalmology and Otolaryngology; was President of the American Otological, Rhinological and Laryngological Society in 1924; was a Fellow of the American Laryngological Association and of the American Otological Society.

In his younger professional life, Dr. Loeb was an active and prominent worker in state and local medical organizations and gave of his time and energies to civic and philanthropic activities.

In the world of Otolaryngology he was one of the most useful factors in his profession and this special field of medicine has been greatly enriched by the application of his suggestions and his talents.

To his wife and daughter and the various members of his family we offer our sincere condolence. His many friends will miss his forceful and sympathetic co-operation; the Otolaryngologic profession will miss his council and strength, and the American medical world will mourn one of its strongest idealists.

M. A. G.

HANAU W. LOEB.

The American Board of Otolaryngology wishes to put on record, as far as the written word may express it, their appreciation of the services of their first Secretary, Dr. Hanau W. Loeb.

Dr. Loeb served the Board in health and in illness and was working for its interests up to the day he died. He sensed the importance of its mission and, as was his custom, gave himself unstintedly to it. He gloried in the mastery of detail. He was an exceptional business man. He was a good executive as well, and a man of broad vision, and quick and wide sympathy. All these talents—rarely combined in one man to the extent in which they were in him—he put at the command of the Board. He looked forward to making its success one of the crowning achievements of his life, and in great measure succeeded. His successor can be appointed, but his place can never be filled. His companions on the Board feel that in recording his loss there is much that lies deeper than words can express.

H. P. M.